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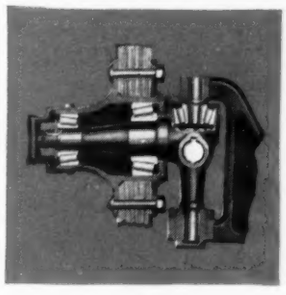

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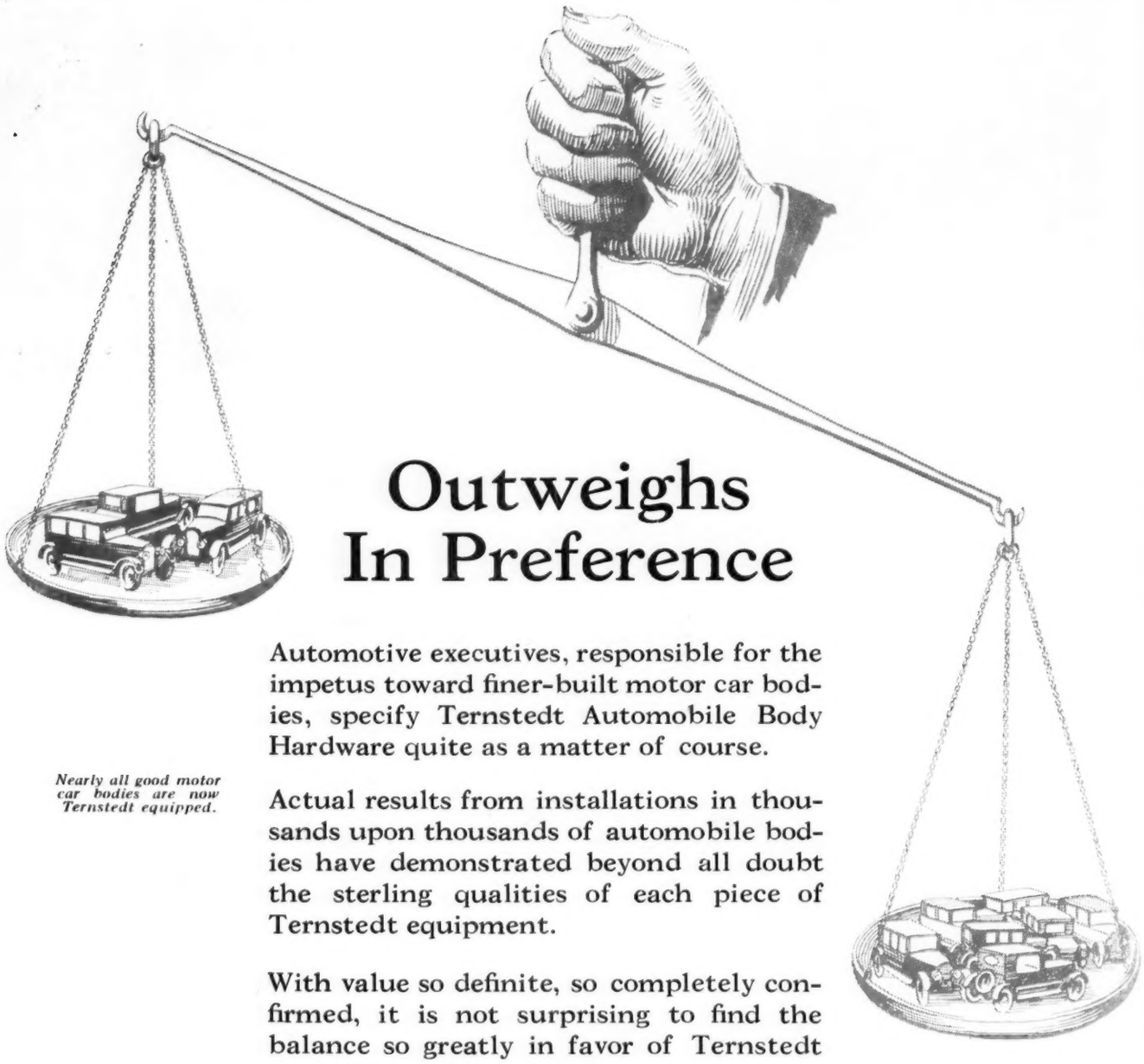

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AUTOMOTIVE INDUSTRIES
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VOL. XLVII NEW YORK—THURSDAY, DECEMBER 14, 1922 NO. 24

Mr. Harding Pleads for Trucks as Railroad Feeders

President says in message to Congress highway transport should be aid to carriers instead of "destroying competitor." Apparently feels good roads should not parallel steam lines. Seems to regard motor vehicles from railroad viewpoint.

By James Dalton

A GOOD many people in the automotive industry were shocked when they read President Harding's references to motor vehicles in his message to Congress. It had been assumed he was a warm friend of the automobile and those who are familiar with what he is thinking insist that he is, but it is rather difficult to reconcile this point of view with some of the statements made in his discussion of the transportation situation.

Mr. Harding evidently has strong convictions on the entire transportation problem. The substance of his belief seems to be that present conditions are intolerable and that something must be done to better them, although he does not suggest concrete remedies. He scolded the railroads rather sharply in his message and it is possible he felt he should not place himself in a position where he could be accused of partiality toward highway transport. He didn't.

Careful analysis of his remarks shows, however, that he is at least reconciled to highway transport and that he does not propose to use his influence to crush it. He suggests, for example, that the motor truck should be converted into a railroad feeder "instead of a destroying competitor." His language is not especially friendly, but the idea is one which the industry has been trying to sell the railroads for a long time. As a matter of fact the sanity of this thought seems to be percolating through the minds of the carriers' executives.

While admitting that "we live in a motor age," it is rather unfortunate that the President and the railroads seem to regard motor transport in exactly the same light. The arguments he presents are the threadbare arguments the railroad propagandists have used so long. Most of them are based either on false premises or half truths.

"It would be folly," Mr. Harding says, "to ignore that we live in a motor age. The motor car reflects our standard of living and gages the speed of our present-day life. It long ago ran down Simple Living, and never halted to inquire about the prostrate figure which fell as its victim.

"WITH full recognition of motor car transportation we must turn it to the most practical use. We ought to turn the motor truck into a railway feeder and distributer INSTEAD OF A DESTROYING COMPETITOR. It cannot supersede the railway lines, no matter how generously we afford it highways out of the public treasury.

"If freight traffic by motor were charged with its proper and proportionate share of highway construction, we should find much of it wasteful and more costly than like service by rail. Yet we have paral-

leled the railways, a most natural line of construction, and thereby taken away from the agency of expected service much of its profitable traffic, while the taxpayers have been providing the highways, whose cost of maintenance is not yet realized.

"The Federal government has a right to inquire into the wisdom of this policy, because the national treasury is contributing largely to this highway construction. Costly highways ought to be made to serve as feeders rather than competitors of the railroads, and the motor truck should become a co-ordinate factor in our great distributing system.

"RAILWAYS are not to be expected to render the most essential service in our social organization without a fair return on capital invested, but the Government has gone so far in the regulation of rates and rules of operation that it has the responsibility of pointing the way to the reduced freight costs so essential to our national welfare.

"Government operation does not afford the cure. It was Government operation which brought us to the very order of things against which we now rebel, and we are still liquidating the costs of that supreme folly.

"The use of motor trucks as feeders for railroads, merger of lines into systems, a facilitated interchange of freight cars, the economic use of terminals and the consolidation of facilities are suggested as ways of economy and efficiency."

THIS article replies to the criticisms of motor vehicles voiced by President Harding in his recent message to Congress. Some of the remarks made by the nation's chief executive about the motor vehicle seem to have been based on erroneous premises and deserve the close attention of all automotive interests.

Considering the proven utility value of the car and truck as transportation mediums it seems scarcely fair at this time to state that the motor car "long ago ran down Simple Living and never halted to inquire about the prostrate figure which fell as its victim."

This statement and others concerning the industry, made in the President's message, are fully discussed in this editorial.

Taking up Mr. Harding's points in sequence, it certainly would be folly to ignore the fact that "we live in a motor age" when 11,500,000 motor vehicles are in use in the United States. The statement that the motor car "long ago ran down Simple Living and never halted to inquire about the prostrate figure which fell as its victim," is a striking figure of speech, but it is only a figure of speech.

Exactly what the President had in his mind is rather obscure and little is to be gained by speculating about what meaning he intended to convey. We sometimes wish that presidential language might always be such that there never could be the slightest doubt about its exact meaning. It frequently is more difficult to have it construed than it is to have an interpretation placed on some act of Congress, the meaning of which is not clear.

A figure of speech frequently illustrates a state of mind. There is no blinking the fact that most officials—Federal, State, county and local—are peevish on the subject of motor vehicles, although as individuals they may be devoted to their cars. For one thing, there are altogether too many accidents. Something must be done to reduce the casualties. If the President's message does nothing more than impress this fact indelibly upon the mind of every man engaged in the manufacture and sale of automotive products, he will have done the industry a real service.

It is useless to deny that there is a growing feeling of antagonism on the part of the public against motor trucks. Truck drivers in particular are responsible for this animosity. They frequently are "road hogs" and they often drive overloaded trucks at a speed which not only is a menace to other motorists but which causes needless damage to the highways they use. Employers and operators must stamp out this disregard for the rights of others.

State regulation of commercial vehicles is coming, whether the industry wants it or not.

State legislatures at their coming sessions probably will enact many unfair and burdensome laws designed to make the highways safer. The intent back of these statutes will be good, but they will be as useless as most of the laws now on the books.

The platform of the industry in this respect should be sane, simple laws with teeth in them and the motorist accused of violating them should be sent to jail if he is convicted after a fair trial.

The President next contends that "with full recognition of motor car transportation, we must turn it to the most practical use." The automotive industry will voice a hearty "amen" to that statement. No one in the industry expects it to "supersede the railway lines no matter how generously we afford it highways out of the public treasury."

Ever since motor trucks became a factor in the movement of freight, some five years ago when the railroads were unable to handle the business offered them, it has been the contention of manufacturers and operators that they never could take long-haul business from the carriers on an economic basis. The same is true of passenger traffic.

The railroads have failed to keep pace with the growth of the country and transportation would have broken down completely had it not been for the aid given by motor vehicles. With business on a normal basis the carriers can't handle the freight offered them with the facilities at their command.

Again, how could the railroads hope to carry the short-haul passenger traffic they would be asked to move today were it not for the automobiles in use? In 1917, when the roads began to take off passenger trains because the movement of freight was more important, less than 5,000,000 motor vehicles were registered in the United States. The number of motor cars in use has more than doubled, but it is just as difficult as it ever was to get a seat in a railroad train.

IT is unquestionably true that the motor vehicle has averted a complete collapse of transportation systems in the United States, but in some official quarters it seems to be given small credit and less thanks for this tremendous achievement.

Equally open to argument is Mr. Harding's statement that "if freight traffic by motor were charged with its proper and proportionate share of highway construction, we should find much of it wasteful and more costly than like service by rail."

Why should motor vehicles pay any more of the cost of building highways which are for the free use of everyone and which enhance by more than their cost the value of the real estate they pass? A comparison of the as-

sessed valuation and the sale price of real estate on improved highways with that on unimproved roads would give some conception of what road building has meant to the United States.

AUTOMOTIVE INDUSTRIES pointed out last week that the total tax bill of motorists last year approximated $341,000,000 compared with $276,500,000 for the railroads. This does not include corporation and other taxes paid by automotive manufacturers. Deducting an estimated $75,000,000 paid by motor vehicle users in personal property taxes, there was left $266,000,000 to apply on a total highway bill of $700,000,000 for that year.

The tax bill will be still bigger for 1922 and larger yet in 1923. Even in 1921 it was vastly more than enough to pay for the maintenance of all improved highways, if it had been used for that purpose, but much of it went into the construction of new mileage.

THE President also complains because highways used for motor transport have paralleled the railroads and "thereby taken away from the agency of expected service much of its profitable traffic." One is prompted to wonder if he would have highway engineers seek routes which would lead through sparsely settled sections merely to escape the railroads and not cut into their business.

When the railroads were built they were designed to pass through the larger cities and towns. Because these places are served by steam lines should they be deprived of good connecting roads or should motor vehicle users be barred from the use of such roads because they might reduce railroad revenue? We may be prejudiced, but we'll confess we can't find in our imagination any sound basis for such a contention.

Mr. Harding rather stresses the statement that "the Federal Government has a right to inquire into the wisdom of this policy because the national treasury is contributing largely to this highway construction." It is true that the Government is contributing $50,000,000 this year for road building, but this sum pays only a fraction of the road building bill and it must be matched, dollar for dollar, by the States to which it is granted. Most of the dollars supplied by the States are supplied by motor vehicle users and the discriminatory excise tax applied by the Federal Government to the sale of automotive products goes a long way toward making up the governmental appropriation for highways.

Promotion of transportation facilities always has been the policy of the Government. It would be interesting to know the present day value of the land grants and other subsidies given the railroads in the early days. They certainly would far exceed any sum spent by the Government up to this time for road building. It is safe to assert also that they added less to the total valuation of American property. Furthermore, the Government is not building highways for the benefit of motor vehicles, but for the good of the people as a whole. If motor transport did not afford universal benefits it would not have grown and prospered as it has.

No fault whatever can be found with Mr. Harding's assertion that "costly highways ought to be made to serve as feeders rather than competitors of the railroads and the motor truck should become a coordinate factor in our great distributing system." This, again, is what the automotive industry always has contended. Only the railroads have been unable to see its wisdom and there are encouraging indications that the light is breaking in the minds of some of the carriers.

Coordination of the motor vehicle—truck, bus and passenger car—in the transportation system is what the country needs, but if motor transport is permitted only where there is so little business that the carriers cannot tap the territory with profit, co-ordination is impossible.

The persons engaged in motor transport are not wailing and wringing their hands over the ruinous competition of the railroads. They have gone into a field which the carriers were supposed to serve and they have gotten the business because the railroads were unable or unwilling to give service. They have had the courage of pioneers, they have stood on their own two legs and they have won without the aid of special pleaders.

Reading the words of the President it almost seems that he feels the railroads should not be subjected to competition by motor trucks; but that cannot be his meaning. Why should they be given a monopoly of transportation? They can't take care of the business offered them now and they probably never can in normally prosperous times.

If they want the motor truck and the motor bus to serve as feeders for their lines they can bring about that coordination by operating the motor vehicles themselves or by co-operating in a friendly way with others who may operate them. If they give as good or better service than independent operators they will get the lion's share of the business. If they don't, they won't.

Mr. Harding asserts that the railroads are entitled to a fair return on capital invested and no one will quarrel with him on that point, but so are the operators of motor vehicles. This fair return to the railroads should not be insured, however, either by monopoly of transportation, Government pampering or any other kind of favoritism. They are not building highways, no matter how much they may argue that they are. Let them compete on a business basis, with reasonable rates, and no one will begrudge them as much as they can make. In the last analysis it is the people who pay the bill.

LACKING a clear and definite knowledge of exactly what was in the President's mind when he wrote that portion of his message, which sounds like an indictment of the motor vehicle, we are reluctant to pass judgment. It must be that he has heard so much about the woes of the railroads and has given so much thought to that question that he has lost sight of the importance of the motor vehicle as an agency of transportation as well as of the fact that the automotive industry stands head and shoulders over every other in the dollar value of its products.

Without special pleaders, without propaganda and without lobbyists, the automotive industry has worked out its own salvation. It has many difficult problems which it is trying manfully to solve, but it proposes to solve them alone. It always has borne and it is perfectly willing to bear its full share of the nation's tax burden. It even has paid special and discriminatory excise taxes without tearing its hair or crying aloud for help.

Up to this time there has been altogether too much of an atmosphere of tolerance, condescension or contempt in the treatment of the industry by various interests, governmental and otherwise.

The time has come for the industry and for the users of its products to stand fast for fair play. They are strong enough to insist upon their rights and big enough not to ask special privileges. The dollar value of the industry's products this year will be nearly $3,000,000,000, the capital invested in its plants exceeds $1,500,000,000, and it gives employment directly or indirectly to 2,500,000 workers.

Automotive interests are perfectly willing to go as far as any reasonable person can expect in co-operating and coordinating with the railroads, but they do not propose to surrender their business rights to the railroads nor to carry an inordinately heavy burden of taxation to assist them in their competition.

Reduction of Selling Costs May Save Weak Companies

Intensive cultivation of circumscribed markets may compensate for lack of capital to operate nationally. Refinancings have brought heavier burdens in period of keen competition. Plunging next year will be unwise.

WITH the year drawing to a close, it is none too early for automotive manufacturers to compute so far as possible the business probabilities of 1923. A solid foundation upon which to stand always can be found for a business conducted along sound lines. There were a good many companies in one field and another which came through the last depression without suffering seriously because they were planted firmly on such a foundation.

Surprisingly few automotive failures resulted from the economic convulsion, but many of the companies which came through suffered heavy losses. Bond issues were the most popular expedient for providing the funds essential for financial salvation. A good many companies also sold additional stock—if they could find purchasers.

As a consequence fixed charges for all except the most fortunate concerns are much higher than they were in 1920. With competition growing constantly keener it will be increasingly difficult to pay these charges and have anything left for working capital. Bond issues are prior liens upon the property and failure to comply with their provisions means ultimate foreclosure.

Quantity production as related to the given price-class is a prerequisite for standing the gaff of competition on a national basis. There may be two companies in exactly the same price class with assembled cars of equal value. One of them may have a distributive organization which permits sales of 10,000 a year, while sales of the other may total only 1000. The one with the larger distribution may operate at a substantial profit, while the one with the smaller sales volume may show either no profit or a loss. The chances are that the less successful concern will have piled up a heavier burden of fixed charges than its competitor.

Small Companies Must Cut Sales Costs

It must be obvious then, that unless the company with the smaller volume cuts down its selling costs by circumscribing its market, it cannot hope to succeed without bringing in additional capital which will add to its fixed charges and merely postpone the evil day. The period of sensational profits in the automotive industry is past except for a few companies which have established themselves so firmly in popular favor that they cannot be shaken.

The industry is in a period of transition and the coming year may bring many changes on the automotive map. There may be more failures than there have been in the past two years, but many of them could be avoided if business policies were re-vamped in time and the problems of the future were faced frankly and courageously. Some concerns probably are hoping against hope that something will happen to save them. If anything does happen, however, it undoubtedly will be the result of some wise plan formulated by a shrewd man.

The time has come for the responsible executives of a good many companies to get together with their bankers and perhaps with their creditors to determine what can be done in view of changing conditions. In most cases it is not too late. There are a lot of concerns turning out meritorious products at fair prices which can work themselves out of their financial difficulties by intensive and intelligent cultivation of the markets close to home.

Reduction of Factory Overhead

Quantity production is an absolute essential only when distribution is sought on a national basis. The same result may be attained in respect to profits by reducing selling costs and cutting down factory overhead.

This situation has no particular bearing upon the 1923 automotive market itself. Business in the aggregate promises to be very nearly as large next year as it has been in 1922. It is quite possible that not so many passenger cars will be sold, but increased demand for commercial vehicles, especially those of small capacity, undoubtedly will compensate for any falling off in this field.

Such a prediction about the automotive market for 1923 must be predicated, of course, upon the assumption that there will be no sharp slowing up in general business. No such misfortune is in sight at this time and there probably never has been a period in the history of the country when the volume of trade has been larger, although profits may have been more substantial.

Business is so good, in fact, that it is carrying the country into a period of secondary inflation. Any prediction as to how long this condition will continue would be only guess work. The rising price trend has caused no serious harm yet, but if retail costs continue to mount indefinitely there will be another "buyers' strike." That is as good a phrase as any to describe the refusal or inability of the people of the country to pay the prices which were demanded of them in 1920.

Sooner or later, unless the rise in commodity prices is checked, there will be a return of something like the conditions which caused the collapse of business and industry in the fall of 1920, although they are not likely to be anything like so acute.

The "buyers' strike" resulted in an unexampled shortage of all kinds of manufactured products. When prices dropped to what the public thought was reasonable levels,

and they began to buy, the demand was commensurate with the shortage. It brought business back with a bang. That is what happened in the automotive field.

It must not be forgotten, however, that the time will come when the dammed up demand will be satisfied and when the public can again get along for an indefinite period without replenishing supplies. When that time comes, unless prices are "right," there will be a temporary suspension of buying.

Everyone admits now that it was lower prices to the purchaser which enabled the automotive industry to make its sensational recovery. And yet, when price cutting began, there were loud wails from a great many people in the industry who contended that it would cause chaos.

So far as open models of passenger cars are concerned, prices are as low now as they can be brought with safety. It may be that some companies can afford to sell their closed models for a little less. As a matter of fact, as production of closed cars increases and of open models decreases, the prices of the two classes will come closer together.

Increase in Materials Cost Slight

It is true that the cost of materials is rising steadily but the aggregate increase thus far has not been large. The parts makers assert that they are the ones who are suffering from short profits and that the vehicle manufacturers can afford to absorb higher costs for supplies without raising their prices to the public.

This may or may not be entirely true, but in any event it will be interesting to note the effect on sales if any material advances in the prices of motor vehicles are made in the coming year.

One other factor which makes continuance of a record-breaking business doubtful, once backed up demand has been satisfied, is the fact that other countries are unable to absorb our surplus products. This is due in part to the tariff wall which has been set up. There has been a gradual economic recovery in Europe and in the other countries of the world, but America cannot take advantage of it because foreign trade, speaking generally, must be on an exchange basis inasmuch as the rest of the world has little cash with which to buy.

Considering the elements of doubt which enter into the situation, this is no time to plunge. Factory expansions and capital increases are dangerous.

For those companies justified in seeking national distribution, however, it is a good time to intensify sales efforts and seek substantial new markets. Most of them can make enough goods without enlarging their plants.

Plunging in 1923 Unwise

Those companies which lack the working capital to justify operations on a national basis can find a mighty good business within a comparatively few miles of their own doors. If they go after this trade they can come out whole.

Not only will the man who plunges in 1923 be unwise, but he will be still more foolish unless he scrutinizes credits with great care. This will apply all the way down the line from the manufacturer to the retailer.

There will be no justification for extending unlimited or even liberal credit lines to companies or individuals whose finances do not fully warrant it. Such companies already are extended as far as they can stretch and if they should run afoul a little adversity they would snap.

Summing up the outlook, those companies which are in a sound financial condition can afford to proceed with confidence as they enter upon 1923. Their prices will be as low as they can make them with a fair margin of profit; their inventories will be well balanced; they will have reasonably good selling organizations; they will have safe cash reserves and they will be in a position to slow up their operations expeditiously if slowing up becomes advisable.

The prosperity which the country is now enjoying is built on a solid foundation and sound companies have nothing to fear from the future if they continue to operate along sound lines. Business generally never has been able to operate at capacity for an indefinite period, however, and it probably never will be. It is governed inevitably by the law of supply and demand.

JAMES DALTON.

Addition to Federal Truck Line

A FOUR THOUSAND to 5000-lb. capacity truck has been added to the line of the Federal Motor Truck Co. and is known as Model U-2. The chassis will be made up in three lengths of wheelbase, the shortest being 12 ft., the standard 13 ft. and the longest 14 ft. It will be made with a short or dumping loading space of 110 in., a standard length of loading space of 134 in. and a maximum length of 158 in. The body allowance is 1500 lb.

The chassis is fitted with a Continental K-4 engine, a four-cylinder 4⅛ by 5¼-in. vertical, L-head, monoblock type with a three-bearing crankshaft and a rating of 35 hp. at 1300 r.p.m. An Eisemann G-4 high tension magneto is used, a Zenith carburetor, Pharo centrifugal oil-type governor, Borg & Beck clutch and Detroit Gear and Machine Co. gearset. The front axle is of Federal design and manufacture while the rear axle is a Timken.

The truck has four forward speeds and one reverse, the ratios in the gearset being 5.899, 3.206, 1.752 and 1 to 1 for the forward speeds and 7.078 to 1 for the reverse. For the final drive the standard reduction is 7.75 to 1 while two other options are offered namely, 8.5 and 9.25 to 1.

The chassis layout is along conventional lines, the transmission being mounted as a separate unit and the propeller shaft divided and fitted with four Spicer universal joints. Propulsion is through radius rods, while the torque is taken on the springs. The tire equipment comprises 36 by 4 front and either 36 by 7 single or 36 by 4 dual rear tires. The steering gear is a Gemmer with 18 in. hand wheel. A 20-gal. fuel tank is mounted on the chassis frame under the seat and feeds through a Stewart vacuum system. The frame is of pressed steel, the channel section side bars being of ¼-in. stock and 6 in. deep. The height of the frame above the ground when loaded is 29 in. at the front and 30½ in. at the rear. Chassis lubrication is by the Alemite system. The electrical equipment includes a Remy generator and side, tail and instrument lamps, an ammeter, a horn and an Exide special truck battery provided with a cushion mounting on frame brackets. A Remy starter is furnished at an extra charge if it is wanted.

Amphibious Tank, Novel Engineering Development, Swims Hudson River

Body rests on six wheels when out of water. Steering gear locked when crawler is used and steering accomplished by running one track faster than other. Screw propellers for water operation. Engine piston displacement is 665 cu. in.

A MACHINE that can take a 75 mm. at considerable speed over good roads and can also transport it over plowed fields, up steep embankments and across lakes and rivers has been developed by Walter Christie, of front wheel drive fame, and was recently demonstrated before army officers and others at Dyckman Street Ferry on the Hudson River. The machine is really a combination of three types of automotive vehicle in one, viz., a wheeled motor truck, a creeper or crawler and a motor boat.

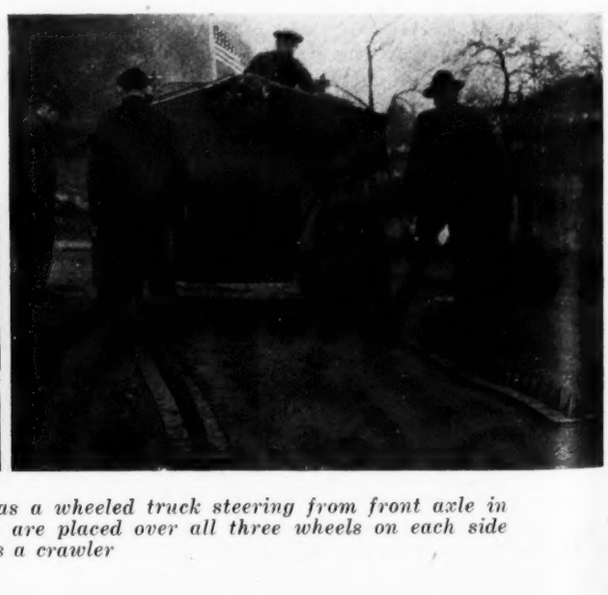
The steel plate hull or body rests on six wheels when out of the water. The interior is divided into two compartments by a perforated steel bulkhead near the middle, the forward compartment being for the gun crew, ammunition, etc., and the rear compartment being occupied by the machinery of propulsion. Directly behind the bulkhead and projecting above it to some height is the radiator, and behind the latter is the engine, with its axis across the machine. The engine is a four-cylinder type, with its cylinders cast in pairs. Cylinder dimensions are 5½ by 7 in., giving a piston displacement of 665 cu. in. The gearset provides three forward speeds and three reverse, which means, of course, that there is a reverse gear which can be used in conjunction with either of the forward gears.

When the machine is used as a wheeled truck it steers in the usual way by means of steering knuckles on the front axle. This axle is of tubular form and extends through the forward part of the hull, being secured to the walls thereof by means of flanged fittings on both the inside and the outside of the hull. The knuckles, however, are not pivoted directly to the ends of the axle but to forward extensions thereof, the torsional moment thus introduced being taken up on vertical brace rods extending from the forward ends of the extensions to the overhanging portion of the hull above. The reason for this construction is that the steering rods come out through the hollow axle, which would be impossible if the wheels were concentric with the axle.

When the vehicle is used as a crawler the regular steering gear is locked and steering is effected by driving the track on one side faster and on the opposite side slower. This is accomplished by means of brakes on both sides of the differential gear, which brakes operate in a bath of oil.

Water Operation of Tank

Similarly, when the machine is operated in the water, it is steered by means of the screw propellers, of which there are two, one very close to each side of the body at the rear. The propellers are 26 in. in diameter and have a pitch of 24 in. All of the transmission gears are located at the rear of the hull and are completely inclosed. The wheels have an outside diameter of 31 in. and are fitted with Overman dual 4½-in. tires. There are three wheels on both sides, so the machine runs on twelve tires. Propulsion can be applied either to the rear wheels alone or to the rear and intermediate wheels,

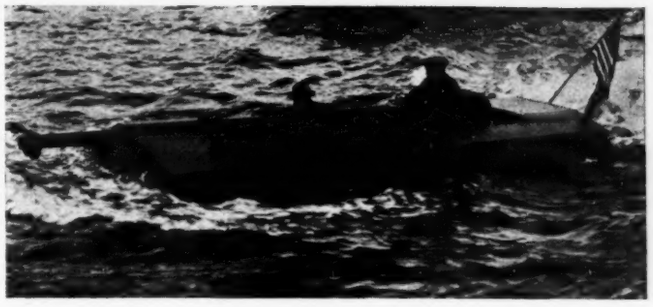


Two views of amphibious tank. One shows machine used as a wheeled truck steering from front axle in customary way. Second view shows chain tracks which are placed over all three wheels on each side when machine is used as a crawler

the two wheels at each side being connected together by means of roller type driving chains on sprocket wheels located on the outer side of each wheel. When the machine is used as a crawler, chain tracks are placed over all three wheels on each side and the rear wheels are then raised off the ground, as it would otherwise be difficult to steer. Power is applied to the tracks by the rear pair of wheels which are made of cast steel and cast with driving bars between the two channels for the tires, with which the driving lugs on the track engage.

Climbs Approximately 40 Deg. Slope.

The machine, which was demonstrated opposite Dyckman Street, has a total reduction between engine shaft and rear axle of 60 to 1. Assuming that the engine develops a torque of 0.55 lb.-ft. per cu. in. displacement, which is a good average figure, the total engine torque is 365 lb.-ft. and with a 60 to 1 reduction this gives a rear axle torque of 17,500 lb.-ft., if 20 per cent is allowed for loss in transmission. With a wheel radius of 1.29 ft. this gives a limiting traction effort of 13,600 lb., which is practically the same as the weight of the machine, so there should be plenty of power for all occasions. At Dyckman Street on the Jersey shore the machine climbed an embankment about 30 ft. high with what appeared to be approximately a 40 deg. slope.



Amphibious tank operating in water. Steering is done by means of the screw propellers of which there are two

When operated as a truck the length of wheelbase is 102 in., but when operated as a crawler the wheelbase is 144 in. The total length of the body is 16 ft., the width, 7½ ft., and the height, 4 1/3 ft. The manufacturer is the United States Mobile Ordnance Co., successor of the Front Drive Co.

Duraloy, a New Heat-Resisting Metal

DURALOY is an alloy of chromium and iron that has been developed by the Cutler Steel Co. for various industrial uses. As a construction material in the automotive industry it can be used for engine valves, and it is also suitable for much of the equipment used in heat-treating plants. The outstanding characteristics of this alloy are said to be:

1. It is non-corrosive.
2. It retains good mechanical properties at high temperatures.
3. It has great resistance to abrasion.

It is these properties, together with its comparatively low cost of production, which determine its fields of application.

Different Commercial Forms

The new alloy can be furnished in different commercial forms, including castings, rolled and forged bars, sheet, wire and tubing. The physical properties, of course, vary with the form in which the material is furnished and also with the specific analysis and the treatment it has received. They range from properties somewhat better than those of cast iron up to those of commercial alloy steels.

In the cast state the ultimate tensile strength varies from 40,000 to 90,000 lb. p. sq. in. and the elastic limit from 30,000 to 80,000 lb. p. sq. in., while in the rolled state the ultimate tensile strength ranges from 80,000 to 130,000 lb. p. sq. in. and the elastic limit from 65,000 to 110,000 lb. p. sq. in. The elongation in 2 in. varies from 2.0 per cent to nothing for the cast material and from 26 to 8 per cent for the rolled material, while the reduction in area varies from 3.0 per cent to nothing for the cast material and from 50 to 10 per cent for the rolled material. The specific gravity is 7.6, the coefficient of heat expansion, 0.000009, the shrinkage allowance for castings, ¼ in. per foot, and the Brinell hardness, 170 to 600.

Duraloy castings are said to be clean, close grained and free from segregations, blow holes and other imperfections. They can be furnished in various degrees of hardness to meet different conditions. In the rolled form the material responds to heat treatment. Bars or sheets can be supplied sufficiently ductile to permit bending, punching, forming, stamping, etc., to be subsequently treated to increase their hardness and wearing qualities. The property of the material to retain a considerable portion of its normal tensile strength at high temperatures is brought out by the following test results furnished by the manufacturers, in which the upper line gives the temperatures of the steel in degrees Fahrenheit and the lower the corresponding tensile strengths in pounds per square inch:

932	1112	1292	1472	1652	1832
98,000	72,000	40,000	25,000	20,000	10,000

The machining qualities vary with the analysis and the subsequent treatment. Rolled sheets and bars machine readily after annealing. Castings can be made soft enough to permit of drilling and tapping, but where hardness is more important than easy machining qualities they can be made to show 600 Brinell, in which case, of course, they can be finished only by grinding.

Welding Process

Welding can be done by either the electric or the oxy-acetylene process, but hammer welding is impossible. For welds between parts of duraloy, welding rod of the same material should be used, whereas between duraloy and another metal standard welding rod can be used. Owing to the fact that the alloy is inoxidizable it cannot be cut by the oxy-acetylene torch. In connection with welding operations, preheating has been found advisable, especially in the case of castings.

It is claimed that the alloy will satisfactorily withstand oxidation up to 2100 deg. Fahr. It will resist atmospheric or salt corrosion indefinitely. It is highly resistant to such corrosive heat-treating materials as molten cyanide, potassium nitrate and sodium chloride. When made specially for abrasive resistance, duraloy is said to be superior to the hardest chilled iron and to manganese steel.

Automotive Industries
December 14, 1922

Great Industries Nearer Agreement on Gasoline Problems

Automotive and petroleum groups approach better understanding through study of utilization factors. Some refiners favor adherence to present government standards but with better volatility in winter. Significance of dilution not yet apparent.

By Herbert Chase

REPRESENTATIVE men in the automotive and petroleum industries are earnestly seeking the solution of problems of great importance to both and, through the medium of careful research work, appear to be nearing a solution of some of the difficulties. In the process they are getting a far better appreciation of troubles for which each was formerly inclined to blame the other. Furthermore tangible results instructive to both are being obtained as a result of their joint activities.

In general fuels are better utilized than they have been in recent years. Difficulties are still encountered, especially in cold weather, but the joint research of the automotive and petroleum industries being carried out by the Bureau of Standards is helping to bring a far better mutual understanding of the problems to be met by producer and consumer than has ever before existed.

What is perhaps the first instance of co-operative research sponsored by two of the greatest industries of the country representing on one hand the producers of fuel and on the other the manufacturers of the apparatus which consumes the fuel in providing transportation, has already proved the wisdom of the undertaking.

The desirability of close general adherence to a standard specification for gasoline, varied by the refiners only to the extent that changes in climatic and seasonal conditions demand, once considered almost impossible by the fuel refiners, is now advocated by some of the largest of them while one of the most prominent says that there is now no excuse for marketing gasoline which does not meet Government specifications.

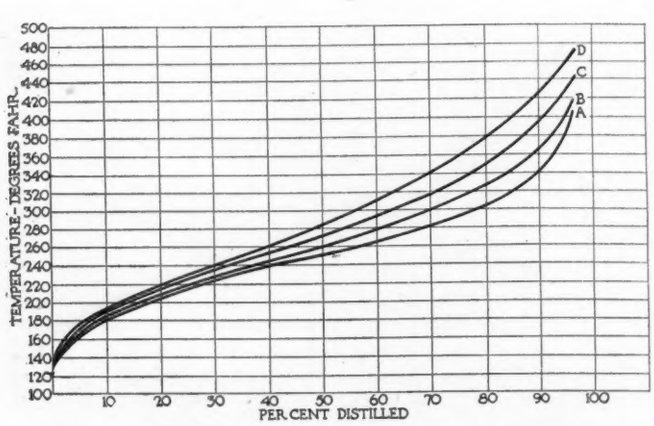


Fig. 1—Distillation curves of the four fuels tested

These are some of the important points of interest to the automotive industry which resulted from the annual meeting of the American Petroleum Institute held in St. Louis last week. Relatively few automotive men were present, due to the distance from automotive centers at which the meeting was held, but those automotive engineers who did attend included a majority of the men who have been prominent in fuel matters which have come before the Society of Automotive Engineers during the past few years.

Executives Interested in Research

Executives in both the automotive and petroleum industries are coming to appreciate the value of research and are giving it financial support as they may well do in view of the importance attached to the results already attained. Briefly stated the results of the co-operative research conducted to date have shown that, so far as warm weather conditions are concerned, there is practically nothing to choose insofar as miles per gallon on the four grades of fuel tested are concerned, providing the carbureter is given a maximum power setting in the case of each fuel. Such limited tests as have thus far been made in an endeavor to learn the relative effect of volatility on dilution of lubricant in the crankcase of engines indicate that this trouble increases as the mean volatility increases, but the effect of cold weather and other conditions known to have a pronounced bearing upon this trouble is yet to be definitely determined.

Reports presented by Director S. W. Stratton and Major R. C. Carlson of the Bureau of Standards, gave in detail results of the research work which have already been given in substance in these columns. These reports served as a basis for most of the discussion which is of interest to the automotive industry. It will be recalled that the fuels tested varied from a volatile gasoline, grade A, to one assumed to be about the least volatile that can be used in the average car in use to-day, grade D. Grade B corresponds closely to the average gasoline marketed in this country at the present time, while grade C is intermediate between B and D in volatility. Distillation curves of these fuels are given in Fig. 1.

B. B. Bachman, president of the S.A.E., expressed the view that with the average car of to-day it is possible to use grade C fuel in warm weather, but that there is grave doubt as to the feasibility of attempting to use grade D fuel in spite of the fact that it has shown the

same miles per gallon in warm weather tests recorded for the more volatile grades. Further tests must be awaited, he said, before conclusions in respect to winter operation, in particular, can be drawn.

Temperature control is proving more important but the true significance of dilution is as yet little understood, said Bachman. Damage to the engine may not be due to the dilution at least up to a certain point but to some effect which results from passage of the fuel by the piston, perhaps by the grit it carries.

J. T. B. Bowles, in common with most other speakers, commended the Bureau of Standards for its work and said that results had confirmed the conclusions of his own company—conclusions which would have failed of general acceptance, however, except for the impartial and thorough work of the Bureau. Bowles further voiced the view of many oil men when he said that it is up to the automotive industry to improve the induction system of the engines it produces. He made a plea for tests of a gasoline in which greater proportions distill at 212 deg. Fahr.

A possible future shortage of gasoline is less likely to occur, said Bowles, because the co-operation which has recently come about between the two industries most concerned is in the interest of conservation.

Adherence to Standard Fuel

Roger Chew of the Standard Oil Co. of New Jersey somewhat surprised as well as gratified his automotive hearers by advocating close adherence to the present government gasoline specifications. He said that the automotive engineer would do well to design engines for this fuel and then let the petroleum industry care for seasonal variations by such changes as may be required or possible —a program which is precisely the same as that advocated by some prominent automotive engineers.

Henry M. Crane, Chairman of the S.A.E. Research Committee, said that he is quite ready to accept the results of the joint research work already done but indicated that it is important to bear in mind that they cover only the favorable conditions of warm weather operation. He pointed out that, as the fuel grows poorer, it becomes increasingly difficult to secure good carbureter adjustment and that small differences in adjustment can, as the tests have shown, make much greater differences in the miles per gallon traveled than a change in quality of fuel within the limits under consideration.

It should be borne in mind, said Crane, that even poorer fuels than grade D, have already been extensively marketed by petroleum refiners, though conditions in this respect have been better in the past two years.

Crane said he had been greatly gratified by the desire of oil men to secure a better understanding of fuel problems as they concern the automotive engineer. He especially appreciated Chew's remarks in favor of producing a more uniform fuel than has been produced in the past. Crane pointed out that the Bureau's tests on the Post Office trucks had shown clearly that best results were obtained when the fuel used was closest to that which the men who adjusted the carbureters were most familiar with using.

Crane commended Thos. Midgley, Jr., and his associates in the General Motors Corp. for their early recognition of the detonation problem and their persistent efforts to learn its cause and find a remedy therefor. This, he said, is one case in which the automotive industry has sought to solve a distinctly fuel problem which the oil industry has only recently come to recognize.

The National Automobile Chamber of Commerce, though it has given financial and other support to the research program, was unfortunately not officially represented at the meeting. It was due largely to the automotive engineers that the co-operative program was initiated and it has devolved upon them to follow it through, though the whole automotive industry will profit by it.

T. G. Delbridge of the Atlantic Refining Co. heartily supported the plea for uniformity made by Chew and added that there is no excuse to-day for marketing less volatile fuel than that which corresponds to the present Government specifications.

O. C. Berry of the Wheeler-Schebler Carbureter Co. asked the refiners to provide more volatile fuel in the winter months and explained the importance which temperature plays in respect to vaporization. He suggested that kerosene should be used as fuel for trucks and tractors, leaving gasoline for passenger car use exclusively, but was not supported by others in this proposal.

H. L. Horning of the Waukesha Motor Co. said that he is of the opinion that the refiners are making sincere efforts to market better gasoline but that adulteration with kerosene by retailers often results in serious difficulties for the user. The oil industry should make every effort to control this situation, he said. Horning stated that, if we could always operate automotive vehicles at temperatures above 50 deg. Fahr., there would be relatively little difficulty with present average fuels. Since, however, the average temperature at points in this country which are further north than St. Louis is below 50 deg. Fahr., and since about 75 per cent of the motor vehicles are located in this area, it is of great importance to consider performance at such low temperatures.

A curve showing the relation between number of cars used by workmen at the Waukesha plant and temperature conditions was exhibited by Horning. This showed that the percentage of cars employed invariably decreased with the temperature. The percentage varied from 100 per cent at 90 deg. Fahr. to zero at minus 30 deg. Fahr., a condition which was attributed by the owners to the increased difficulties in starting as temperature decreases. This condition, said Horning, results in loss of business for the oil industry and is one which they should seek to correct by furnishing better fuel in cold weather, especially in localities where low temperatures prevail for several months of the year. Some companies are selling better fuel in the winter, he said.

Horning stated that he has recently developed an engine with 5 to 1 compression ratio which uses present commercial gasoline satisfactorily. Careful piston and ring design have aided in attaining this result.

End Point Illogical Basis for Comparison

R. Haskell of the Texas Co. stated that the end point is not the logical basis for comparing fuels. He said that engines which will burn less volatile fuels than are now generally sold can and will be built and that it is desirable to eliminate some of the personal elements upon which their satisfactory operation is now partly dependent by providing automatic temperature regulation.

H. C. Dickinson, manager of the S. A. E. Research Department, stated that better progress has been made in the co-operative research work than was anticipated. The effort has been to learn what fuel is best for both industries, conservation and all other factors considered. The effect of fuel quality on starting, lubricant dilution and carbon formation are among the items still to be fully investigated, but the tests made to date show that there is no increase in cost per mile of operation under warm weather conditions with the less volatile fuels. He pointed out that, whereas petroleum is consumed within a few months of the time it leaves the well, automotive engines which burn it not only require considerable time for design

and production but continue in use for several years thereafter. Hence the need for looking ahead in designing present cars.

R. E. Wilson of the Standard Oil Co. of Indiana pointed out the advantage of using the 85 per cent instead of the end point in comparing fuels; since the temperature at this point is in almost direct proportion to the condensation temperature and is thus a better index of volatility as well as the tendency to cause lubricant dilution. He gave the following table of data in this connection:

Fuel	85% Point, Deg. Fahr.	Condensation Temperature, Deg. Fahr.
A	318	82
B	342	98
C	377	120
D	400	149

Five points on the distillation curve of gasoline are too many to specify, said Wilson. He urges use of 85 per cent and and 25 per cent points, the latter being a good index of the starting characteristics of the fuel.

Frank A. Howard of the Standard Oil Co. of New Jersey said he regarded the meeting the most significant of any which the Institute has held. He said, in respect to research, that we have learned much concerning temperatures required for vaporization and much about the prevention of detonation. We must now concentrate our attention upon solution of the problem of lubricant dilution, learning how much dilution is possible without detriment and whether the added cost of gasoline which would be free from this dilution tendency is worth while in an economic way.

W. M. Welch of the Association of Natural Gasoline Manufacturers said that about 10 per cent of our domestic supply of gasoline comes from natural gasoline. This light distillate is an excellent fuel but because of blending with fuel which is not well suited for automotive uses has sometimes gotten a bad reputation. When properly blended it makes an excellent light end and is fortunately available in larger quantities in winter when these light fractions are particularly needed.

What Warm Weather Tests of Fuels Indicate

Practically the same miles per gallon consumed but greater dilution of lubricant is shown by less volatile fuels.

IN earlier issues of AUTOMOTIVE INDUSTRIES, especially that of Sept. 28, 1922, reference has been made to road tests being made by the Bureau of Standards, on four of the most widely used makes of cars now in use in this country, and some general conclusions as to the results obtained have been reported. Further particulars, including specific data in respect to the performance of the various cars tested were released at the meeting of the American Petroleum Institute last week and a somewhat detailed summary of these is here published for the first time.

The cars were tested over a 2.8 mile level course divided into tenth mile sections. The speed for each section was either higher or lower than that of the preceding section so that numerous accelerations were made. Fuel was measured for each tenth mile, and each car was handled in a precisely similar manner except that car which had a non-adjustable carbureter was tested with only this one setting.

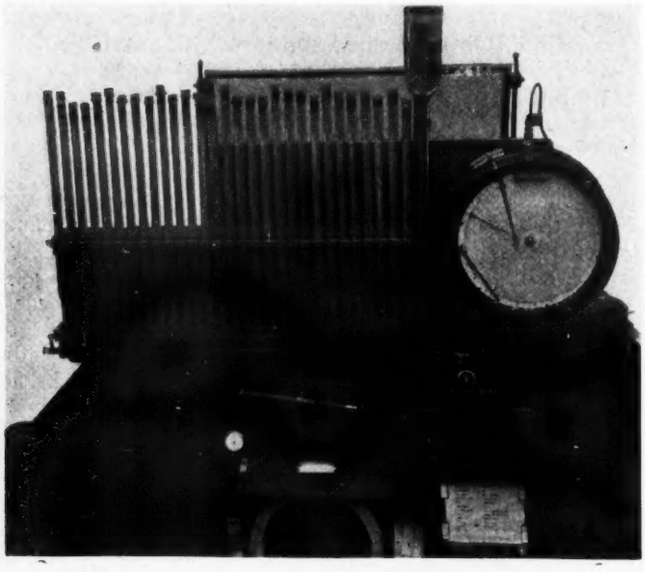


Fig. 2—Apparatus used for fuel measurement

A summary of the results is given in Table I. They indicate that, for the warm weather conditions involved, practically no difference in miles per gallon was found for the four fuels providing the carbureter was set in each case to give maximum power. In each case the comparison was with fuel B, the reference fuel, and under precisely comparable conditions on the same day, so that in interpreting the results comparisons should be made on the same basis.

The fuel measuring apparatus used is shown in Fig. 2. It consisted of a series of thirty-two burettes, each of 50 cc. capacity. These burettes were provided with a rubber tube and cut-off cock at the bottom so that by a single movement of the hand one burette could be closed and the adjoining one opened. Each burette was used during one-tenth of a mile around the test course, being opened at the beginning of the section when the stake was passed and closed at the end when the next stake was passed. Each of the burettes therefore indicated the fuel consumed while passing over a given section of the course with the car performing a fixed schedule of acceleration, constant speed, or deceleration. Inasmuch as zero was at the top, the burettes were direct reading and when the car had traversed the entire course the readings of all the burettes were recorded. The sum of these readings gave the total fuel consumption for the circuit.

The crankcase, differential and outlet water temperatures were recorded by means of long distance indicating thermometers, at the beginning and end of each run. Accelerations were made with wide open throttle and decel-

eration by closing throttle but without using brake. The time was obtained by means of a split second stop watch.

The tire pressures were recorded and the tires were pumped up to a fixed pressure each morning before the tests were started. Driving the car from the Bureau to Potomac Park insured that temperature conditions were fairly constant before the beginning of runs.

Relative humidity and barometric pressure data were obtained from the United States Weather Bureau.

The recording tachometer and vacuum gage gave an indication of the handling of the throttle and the speed variation of the car while proceeding along the course. By careful work it was possible to obtain results which agreed within 3 per cent.

In order to obtain information as to the effect of these four fuels on oil dilution in the crankcase two cars were given road tests between Washington and Frederick, Md., a distance of approximately 50 miles one way. This road is in fairly good condition and includes a relatively large number of hills. An average speed of 25 miles per hour was maintained.

Two round trips, representing a total of two hundred miles, were made for each fuel. In addition, check runs were made to get an idea of reproducibility of results. Before the start of the run on each fuel, the crankcase was drained, new oil put in and the engine run for five or ten minutes. This oil was then drained out and the crankcase filled with new oil. No additional oil was added during the 200-mile run. Eight-ounce samples were carefully analyzed for dilution and viscosity. Inasmuch as the runs were made under summer conditions and fairly high road speed, it was appreciated that the dilutions obtained would be relatively low, and for this reason a careful endeavor was made to keep the operating conditions as nearly alike as possible.

The curves in Figs. 3 and 4 show graphically the change in dilution and viscosity of the lubricating oil during these tests.

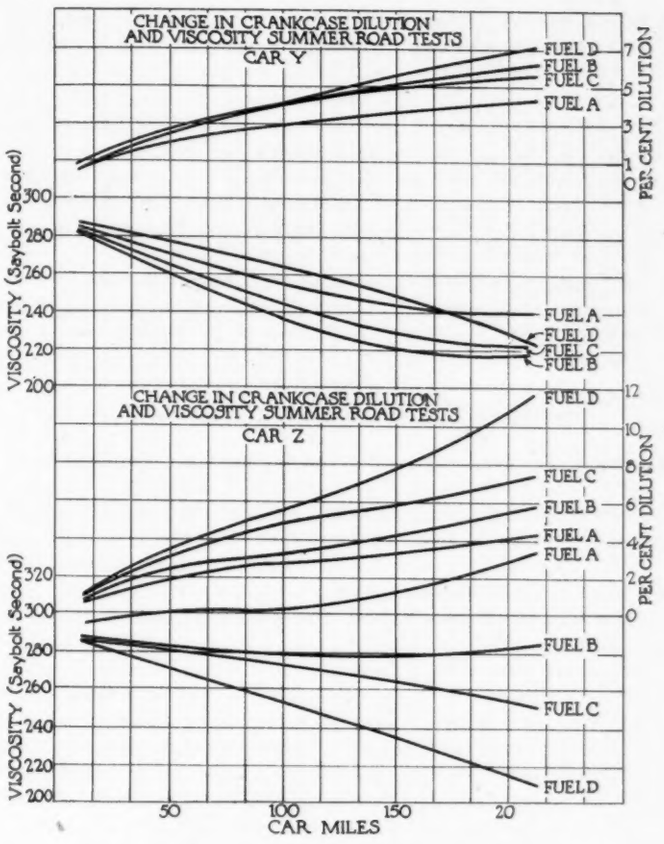
Analysis of Tests Under Summer Conditions

In the case of Car X, which had a fixed jet type carbureter, fuels *B* and *C* gave approximately the same miles per gallon, namely, 22.7. Fuel *A* as compared with fuel *B* gave less miles per gallon. Fuel *D* as compared with *B* gave more miles per gallon. It is probable that this difference can be accounted for by a consideration of the difference in density and viscosity of the four fuels tested. If the jets were of correct size for a gasoline such as fuel *B*, then more of fuel *A*, which has a lower density and viscosity, would flow through and the effect would be to give a slightly richer mixture. Conversely, less of fuel *D*, which has a higher viscosity and greater density, would flow through the jet and tend to give a leaner mixture.

Table I

Average results of mileage tests under warm weather conditions. Carbureter set with each fuel for maximum power except in case of car X which has fixed jet.

Car	Fuel	Average Time for Course, sec.	Miles per Gallon, average	Ton-Miles per Gallon, average
W	B	724.8	19.41	36.5
	A	728.2	20.49	38.53
	B	714.0	19.00	35.74
	D	715.5	18.23	34.28
	B	718.3	19.10	35.82
	C	721.6	18.34	34.47
X	B	707.9	22.72	28.65
(Fixed	C	696.4	22.67	28.58
Jet)	B	684.1	24.43	30.8
	A	684.7	23.98	30.25
	B	714.8	23.48	29.61
	D	712.0	24.07	30.34
	B	668.2	18.36	29.51
	A	672.4	18.89	30.36
Y	B	663.9	18.69	30.03
	C	661.8	19.08	30.65
	B	667.05	19.32	31.5
	D	666.5	19.2	30.8
	B	669.7	22.65	26.5
	A	669.3	22.9	26.7
	B	666.7	22.73	26.55
Z	C	666.1	22.38	26.13
	B	664.7	22.79	26.63
	D	663.3	22.25	25.97



Above, Fig. 3, and below, Fig. 4, showing effect of various fuels on dilution of lubricant

In the case of cars Y and Z when the carbureter was adjusted for maximum power for each test fuel, there is practically no difference in miles per gallon. The time required to make the circuit of the test course was within one or two seconds of being the same, so that under these conditions of test and carbureter adjustment the car performance was the same. In view of these results it is reasonable to state that in so far as the four test fuels are concerned, and under the conditions of these tests there was practically no measurable difference in miles per gallon between the four test fuels.

The effect of carbureter adjustment can be noted from a comparison of the general averages for the runs in which the carbureter was set for *B* fuel with the general averages for the runs in which the carbureter was adjusted for each test fuel. When the *B* fuel setting was used for all fuels, *A* showed less and *C* and *D* showed more miles per gallon, but when the carbureter was adjusted for each test fuel these differences were practically nil.

In so far as these four test fuels are concerned, it can be said that the effect of carbureter adjustment has a greater bearing on miles per gallon which it is possible to obtain than any difference inherent in the fuels themselves. In car *Y* the differences in dilution and changes in viscosity were not as marked as in car Z. Car Z had a

planetary type transmission, and it will be observed that with fuel *A* at the end of 200 miles the viscosity increased and with fuel *B* the viscosity was approximately the same as the new oil. The dilution obtained for these two fuels was between 4 and 6 per cent at the end of 200 miles, about the maximum distance which could be run without adding new oil, so that the ill effects of dilution in this car were in a measure, at least, ameliorated by the necessity of adding new oil before the dilution became so great as to be really harmful.

Although the dilutions obtained in these road tests were not high, they are of interest as a comparison between the four fuels, since the conditions under which the tests were made were kept as nearly constant as possible.

Dilution Greater with Less Volatile Fuels

From an examination of the data obtained through these road tests, it can be seen that a slightly greater dilution of lubricating oil resulted from the use of the less volatile test fuels.

Although the results of the summer tests showed no measurable differences in fuel economy for the same car performance, it is felt that this investigation would not completely cover the field unless it were continued to include tests under conditions of lower temperatures.

After considering the results of the summer tests, the Steering Committee of the S.A.E., A.P.I. and N.A.C.C. authorized the continuation of this work to include cold weather conditions. It was the consensus of opinion that if there were any marked differences between the four test fuels in miles per gallon, ease of starting, and crankcase dilution, these differences might be more apparent when the fuels were tested under winter conditions. In addition to obtaining purely comparative data, a broadening of the scope of the program was authorized so as to permit making a study of the conditions which should be of major influence on the questions under investigation, namely, economy, ease of starting, acceleration, and crankcase dilution.

On this basis, a program of low temperature tests has been laid out which aims to determine first what conditions influence results and then to obtain quantitative measurements under conditions as similar as possible to those likely to be encountered in actual service. The initial stages of this investigation are being carried out in the laboratory, where easy and accurate control of temperatures is possible. An electric dynamometer and inertia load are being used to give load conditions comparable to those encountered in actual service.

In general, the laboratory investigation aims to discover conditions under which a richer mixture is required with one fuel than with another for a given performance. When these conditions are found and the difference in fuel consumption measured the results are applicable to service conditions by determining through actual road tests or other means how often these conditions occur in ordinary driving. The maximum difference in fuel consumption to be expected between the four fuels in actual service would then be the difference in fuel consumption as measured by the laboratory under the worst conditions multiplied by some factor which would represent the proportion of total driving under which these worst conditions exist.

Cold Starting and Acceleration

As an example, suppose one of the fuels required a richer mixture than another during starting cold and accelerating to normal speed. If this richer mixture were obtained through the use of the choke and the carbureter adjustment were not changed, then the difference in fuel consumption between the two fuels would depend principally on the amount of cold starting and acceleration included in the ordinary day's driving under cold weather conditions.

If, however, the carbureter were adjusted to give a richer mixture and thus help starting, and if the mixture were not leaned down after the engine had warmed up, then the difference in fuel consumpton would be dependent largely on the number of car drivers expressed in per cent

Table II

Low Temperature Laboratory Tests—Co-operative Fuel Research

Series I— Test No.	Speed	Load	Mixture Ratio	Jacket Water Temperature	Inlet Air Temperature	Choke Position
1	Lowest for full throttle operation	Full, ¾, ½, ¼, 1/10 and no load	Varied for each load, full lean to full rich (appreciable drop in power)	Normal	Normal	Open
2	Same	Same	Same	Same	Lowest for steady running	Same
3	Same	Same	Same	10° C. below normal	Heated to give best performance and varied to lowest for steady running	Same
4, 5, etc.	Same	Same for each step	Same for each step	Reduced in steps of 10° C. until engine will not run	Same for each step	Same
Series II—						
1, 2, 3, etc.	Engine speed corresponding to 20 miles per hour	Otherwise same as Series I				
Series III—						
1, 2, 3, etc.	Intermediate or other speeds if found necessary	Otherwise same as Series I				
Series IV—						
1, 2, 3, etc.			Same as Series I except choke			Varied until closed as much as posible
Series V—						
Acceleration runs under conditions of Series I, but with fixed maximum load						

Table III

Physical Characteristics of Four Test Fuels

	Fuel A	Fuel B	Fuel C	Fuel D
Initial	120° F.	128° F.	125° F.	130° F.
85%	316° F.	342° F.	367° F.	399° F.
Dry	403° F.	417° F.	446° F.	472° F.
Av. B. P.	250° F.	257° F.	275° F.	288° F.
Av. Mol. Wt.	111.5	114	119.5	123.5
Specific gravity (26° C.)	.727	.733	.736	.740
Index of Ref. (28° C.)	1.4100	1.4110	1.4150	1.4165
Viscosity (Cent. 26° C.)	.527	.533	.577	.592
Equil. Temp.	304° F.	325° F.	349° F.	378° F.
Dew Point 12:1 Mix.	52° F.	88° F.	117° F.	153° F.
Doctor	Sweet	Sweet	Sweet	Sweet
Unsat.	5.5%	6.5%	6.0%	6.0%
Moisture	None	None	None	None
Acidity	None	None	None	None
Reaction test	None	None	None	None

of total who do not adjust the mixture to the engine's requirements.

The laboratory investigation will be supplemented by such road tests as may be found necessary.

Table II shows the series of tests now under way. The tests shown in Series I, II and III, are for the purpose of determining what mixture ratio is required for a specified performance. These tests are being made using each of the four test fuels at full, ¾, ½, ¼, 1/10, and no load at engine speeds of 400, 800, and 1200 r.p.m., and with the mixture ratio changed for each run from the leanest to the richest possible. The temperature of the entering air and jacket brine is varied as outlined in the table from normal air and jacket down to coldest air and jacket brine.

The runs in Series I will be repeated with the choke closed as much as possible. These runs should give the following information for each fuel:

(a) The leanest mixture at which each fuel will operate.

(b) The influence of load upon that mixture.

(c) The influence of jacket temperature upon that mixture.

(d) The influence of air temperature upon that mixture.

(e) The influence of air pressure on the action of the fuel jet.

The last item (e) will be obtained from the runs with the choke closed as much as possible.

In order to obtain information as to the effect of mixture ratio on acceleration, the runs shown as Series V in Table II will be made. The dynamometer is provided with an inertia disk so proportioned that its acceleration requires the same energy output by the engine as the acceleration of the car from which the engine was taken. If a difference in the rate of acceleration is found between two fuels which difference could not have been predicted from previous runs, then this difference must be due to the difference in the rate of vaporization of these fuels.

The preceding tests will show the limiting conditions of temperature under which the engine can run and also under which it can accelerate for various conditions of temperatures and mixture ratios for each of the test fuels.

In order to obtain information concerning the relative ease of starting with each of the four test fuels, the following procedure will be observed: The lowest jacket and air temperature will be selected at which the engine will run steadily. Under these conditions a series of starts will be made using five needle valve, three throttle and three choke positions. The number of revolutions necessary to obtain the first explosion, as well as the revolutions and time required to obtain steady running, will be recorded. The fuel required during this period, as well as the fuel required until the engine will run steadily and accelerate, will be measured. After the engine has attained steady speed the readings will be taken to give mixture ratio. These runs will not only give an indication of the relative ease of starting when the four fuels are used, but also as to the effect of compression pressure and manifold suction as well as fuel consumption during starting and acceleration.

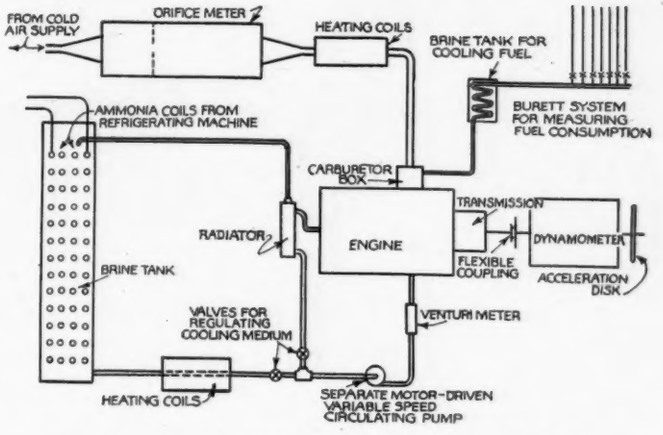


Fig. 5—Arrangement of apparatus for winter tests

In order to obtain information as to the relative effect of the four fuels on oil dilution and change in viscosity of the lubricating oil, a series of runs will be made at various loads and with mixture ratios varied to correspond with those ordinarily used by average car drivers.

The arrangement of the apparatus necessary to carry out this program of winter tests is shown in Fig. 5. The engine, circulating system and air supply system are all inside of a heat insulated chamber. Low air and jacket brine temperatures are obtained by direct expansion of ammonia in coils. Temperatures are measured by means of thermocouples.

The operation of the apparatus is apparent from an examination of the diagram. The set-up has been given preliminary trials and so far appears to be adequate for the work contemplated.

The program for winter runs as described above may be varied slightly, as the results of tests indicate the necessity for doing this. This whole laboratory work should determine what difference exists between the test fuels under various conditions, in order to determine when and where these differences are found, this laboratory investigation will be supplemented by such road tests as may be found necessary to permit of a quantitative measurement of fuel consumption under the worst and under the best conditions of operation which might be expected to occur in actual cold weather car operation.

It is too early to give here any data obtained from this winter program, but every effort is being made to push this work so as to make the results obtained available at as early a date as possible.

Table IV

Characteristics of Test Cars Used

Car	W	X	Y	Z
Year	1920	1920	1920	1920
Number of cylinders	6	4	4	4
Bore and stroke	3⅜x4½	3 11/16x4	3⅞x4½	3¾x4
Piston displacement cubic inches	241.6	171	212	177
N.A.C.C. Hp. rating	27.3	21.75	24.03	22.5
Wheelbase, inches	118	102	...	100
Weight, lbs., including equipment and crew	3760	2450	3210	2335
Tires	33x4	31x4	32x4	30x3½
Gear ratio	4.0	3.67	4.166	3.63
Miles run, approx.	15,000	10,000	15,000	12,000

Electrical Equipment Standards Modified by Committee

Tentative specifications for generators and starting motors altered at recent session of Standards Committee. Changes suggested by letters published in *Automotive Industries*. Work progressing rapidly with broadening possibilities.

THE Standards Committee of the Automotive Electric Association, which undertook last spring the task of standardizing electric generators and starting motors for motor vehicles of all classes, recently held a session in Cleveland to consider various suggestions that have been received from the industry on the tentative specifications agreed upon at the annual meeting at Old Orchard, Me., in August. As a result of the deliberations of all of the manufacturers the specifications were more or less altered. The new specifications arrived at are not final, but represent a step forward in this standardization program.

Chairman Joseph Bijur of the Standards Committee, who presided, was more than pleased with the progress toward standardization and the unanimous co-operation given by all members. The work is progressing faster than was anticipated and the possibilities of standardization are broadening with each meeting of the committee. President A. D. T. Libby of the Automotive Electric Association, who is very strongly in favor of a vigorous standardization program, attended the meeting.

Following the publication of these tentative specifications there appeared in AUTOMOTIVE INDUSTRIES a considerable number of letters from men prominent in the industry commenting on the proposed standards and offering suggestions of various kinds. During this interval the members of the committee have had opportunity to confer with their engineering staffs and all of the views thus obtained were thoroughly discussed. The committee went over each one of the letters in AUTOMOTIVE INDUSTRIES and as a result of this study and of their own reflection the members decided upon some modification of the specifications previously set up.

Omit Cold Test Requirements

All of the manufacturers agreed that in specifications of generators the cold test requirements could be omitted to advantage because it is the hot output of a generator that is most important. In omitting all reference to the cold performance of the generator, the committee had in mind that their output is lower at high temperatures due to the increased electrical resistance of the machine, and that an output based on a hot machine would be a more conservative rating. Furthermore, in actual operation, the generator warms up very quickly due to the heating of its current and therefore soon reaches a comparatively high temperature at which it continues to operate. It was thought that the cold output was merely a good indication of what the generator would do but not as accurate a criterion of its capacity as its hot performance.

The committee further decided that the cut-in speed of a generator, that is, the speed in r.p.m. of a generator at which it begins to charge the battery, should be eliminated from all future specifications. This conclusion was based on the fact that a generator must balance the load it has to carry at a low speed, that is, a speed below what might be described as the average speed of the generator; and the generator should, at higher than average speeds, be more than capable of carrying the load.

Chairman Bijur, in commenting on the elimination of cut-in speed from future generator specifications, explained it as follows:

Generator Output

"The output of a generator should be such that at car speeds which can be relied on to be reached under any reasonable conditions of driving, the generator current should slightly exceed the amount consumed in all electrical devices. At higher car speeds the output should increase sufficiently so that at what can be relied on as average speed, the surplus available to charge the battery should more than compensate for the drain on the battery during periods of ultra low car speeds, or with the vehicle at rest.

"To put it more briefly, the generator must balance the load at a low speed and at a high speed be capable of doing considerably more.

"The precise point where the generator begins to do anything at all, comparatively speaking, is described as the point of cut-in, but this has little or no effect on the adequacy of the machine as a satisfactory source of current. It is very much as if a man who wanted a hundred bushels of wheat on Aug. 1 specified when this wheat should begin to grow in the fields.

"An examination of the current curve of a generator will disclose that the average output below the speed where it carries the load varies little whether the cut-in begins at 5 or 7 m.p.h. provided the speed of balancing the load is the same in either case. Furthermore, it would be apparent that the time of this ultra-low speed operation is such a small fraction of the total time during which the car is in motion that variation of the average current value during this period has a negligible effect on the essential factor, namely, the total ampere hours supplied by the generator while the engine is running."

The new generator specifications have been broadened to include a wider range of generators covering cars, trucks, buses and gasoline railroad cars. In the tentative specifications drafted at Old Orchard Beach the committee had agreed on two sizes of generators to serve the pas-

senger car field but has now added one. There are three suggested sizes for passenger cars; two suggested sizes for motor trucks, and three additional suggested sizes for buses, gasoline railroad cars, etc., making a total of eight generator sizes to cover the entire field. As the specifications of generators as now drawn permit voltage-generators to be included under them, the separate reference to voltage-regulator generators has been omitted. The new generator specifications make no reference to the speed of the vehicle, or to the class of car on which the generator is used.

Three Generator Standards

The consideration of all of the data before the committee showed that to cover the range of the great majority of cars a selection of three generators would be advisable and that these generators could well be rated at one speed for all, but with differing outputs to agree with the varied demands of the different sized vehicles. For machines of the lowest outputs it was recognized that working temperatures have been in successful use which are higher than the committee would prefer to see in generators of larger capacity in which a more liberal margin of reliability is also demanded.

The committee thought it now possible to eliminate the range of speed included in the old specifications and to give a definite speed in armature revolutions at which, for example, the current output should balance the load. Similarly, the critical output of the generator has been fixed at a definite rate of amperage. The generator specifications now call for a drop in the current curve of all generators as the speed of the generator increases. This curve characteristic was not incorporated in the smallest generators in the earlier specifications.

The eight different types of generators, their speed, current output, etc., are given in the following tabulation:

Generators Intended Primarily for Drive at 1½ Times Engine Speed (Mostly passenger cars)

Generator Speed Rev. per Min.	No. 1 Generator Amperes	No. 2 Generator Amperes	No. 3 Generator Amperes
1050	Not less than 7	Not less than 8	Not less than 10
1600	Not less than 10	Not less than 12	Not less than 15
2200	Not over 9	Not over 11	Not over 13
Maximum permissible temperature rise at maximum load.	100 deg. C.	90 deg. C.	80 deg. C.

Generators Intended Primarily for Drive at Engine Speed (As from magneto shaft of 4-cylinder engines on trucks or cars)

Generator Rev. per Min.	No. 4 Generator (Output same as No. 1)	No. 5 Generator (Output same as No. 3)
700	Not less than 7	Not less than 10
1050	Not less than 10	Not less than 15
1400	Not over 9	Not over 13
Maximum permissible temperature rise at maximum load.	90 deg. C.	80 deg. C.

Generators Intended Primarily for Buses of Various Kinds (Generator speeds not yet determined)

	No. 6 Generator	No. 7 Generator	No. 8 Generator
Maximum output in watts	200	300	450
Nominal voltage at generator terminals	8 for 3-cell bat. or 16 for 6-cell bat.	16 for 6-cell bat.	16 for 6-cell bat.

The specifications as actually drawn up by the committee covering the generators tabulated above are the following:

"The ratings are based on a test in which the machines are operated at maximum load until the temperature ceases to rise more than 2 deg. in one-half hour, after which they are to give performance as listed below.

"Where regulation is by means of third brush alone the following classification is recommended, but where regulation is by other means, equivalent performance is recommended.

No. 1 Generator

"At a speed not exceeding 1050 r.p.m. to give not less than 7 amperes at 8 volts.

"At a speed not exceeding 1600 r.p.m. to give not less than 10 amperes at 8½ volts with a rise of temperature not exceeding 100 deg. C. when measured with a thermometer not over 1/16 in. away from the commutator.

"At a speed not exceeding 2200 r.p.m. it will permit the current to be maintained at a value of not over 9 amperes.

No. 2 Generator

"At a speed not exceeding 1050 r.p.m. to give not less than 8 amperes at 8 volts.

"At a speed not exceeding 1600 r.p.m. to give not less than 12 amperes at 8½ volts with a rise of temperature not exceeding 90 deg. C. when measured with a thermometer not over 1/16 in. away from the commutator.

"At a speed not exceeding 2200 r.p.m. it will permit the current to be maintained at a value of not over 11 amperes.

No. 3 Generator

"At a speed not exceeding 1050 r.p.m. to give not less than 10 amperes at 8 volts.

"At a speed not exceeding 1600 r.p.m. to give not less than 15 amperes at 8½ volts with a rise of temperature not exceeding 80 deg. C. when measured with a thermometer not over 1/16 in. away from the commutator.

"At a speed not exceeding 2200 r.p.m. it will permit the current to be maintained at a value of not over 13 amperes.

No. 4 Generator

"At a speed not exceeding 700 r.p.m. to give not less than 7 amperes at 8 volts.

"At a speed not exceeding 1050 r.p.m. to give not less than 10 amperes at 8½ volts with a rise of temperature not exceeding 90 deg. C. when measured with a thermometer not over 1/16 in. away from the commutator.

"At a speed not exceeding 1400 r.p.m. it will permit the current to be maintained at a value of not over 9 amperes.

No. 5 Generator

"At a speed not exceeding 700 r.p.m. to give not less than 10 amperes at 8 volts.

"At a speed not exceeding 1050 r.p.m. to give not less than 15 amperes at 8½ volts with a rise of temperature not exceeding 80 deg. C. when measured with a thermometer not over 1/16 in. away from the commutator.

"At a speed not exceeding 1400 r.p.m. it will permit the current to be maintained at a value of not over 13 amperes."

Specifications Still Tentative

Chairman Bijus, in emphasizing the fact that the newly drafted specifications are not final, expressed the thought of his standards committee as follows:

"It should be clearly understood that these specifications are only tentative. The work has not as yet been submitted to the Board of Governors of the association for approval and the figures are consequently subject to further revision.

"I think that I am expressing the sentiments of our committee when I say that we found the suggestions received in the contributions to AUTOMOTIVE INDUSTRIES very helpful in assisting us to arrive at this new specification. We shall welcome any further comments on this specification which readers may care to contribute."

Uniform Regulation of Engine Speed

Engine speed does not usually vary directly with displacement of throttle lever. Connecting linkage of control lever and steering column can be so arranged as to make variation of speed more nearly proportional to lever movement. Layout described.

By Heinrich Dechamps

IN most present day cars a uniform displacement of the throttle lever on the steering column does not result in anything like uniform variation of engine speed. A slight displacement from the idling position gives the impression of great sensitiveness of the control and produces a rapid increase in the speed of revolution, but the last one-third of the control lever range generally has little effect, the speed increasing almost imperceptibly.

This phenomenon is based on the fact that the speed of an engine is by no means proportional to the area of throttle opening. When the throttle valve is nearly closed, there is a strong depression in the inlet manifold, which results in a higher gas speed through the throttle and, consequently, in a proportionately more complete filling than with a more open throttle.

If a co-ordinate diagram is constructed in which the engine speeds in r.p.m. are drawn in as ordinates and the corresponding positions of the throttle lever, expressed in percentages of its total range of motion, as abscissas, a curve of the type represented by A in Fig. 1 is obtained. At first it rises very rapidly but later becomes gradually more nearly horizontal. For sensitive control of engine speed there would be required a mechanism giving a rather different curve, one rising slowly at first and then substantially uniformly, as shown by D in Fig. 1.

Profiling Throttle Opening

The simplest method of obtaining such an ideal curve, which has been repeatedly used in the past, consists in suitably profiling the throttle opening, so that for uniform displacement of the throttle lever the opening increases at first slowly and then constantly more rapidly, as shown in Fig. 2. A sliding type of throttle valve of this form, however, becomes materially heavier, more expensive and more bulky than an ordinary butterfly valve. The gas passage, also, is less favorable, as there are abrupt changes in the sectional area, at the edges of which any incompletely vaporized fuel has a tendency to collect. For this reason, the simple butterfly valve has almost completely displaced all other forms of throttle. With this design, the opening automatically increases at first more slowly and then more rapidly than the throttle lever displacement, but this non-uniformity is not nearly sufficient to give the desired control curve. It is, therefore, necessary to insert a variable transmission between the throttle lever and the control lever, so that a uniform displacement of the former produces at first a very slight and then a constantly increasing displacement of the latter. Inasmuch as these two parts, located some distance apart, are connected by a link and lever system, it is possible to attain the desired end by merely arranging the levers in proper relation to each other, as will be shown in the following. All that is necessary is a careful layout in order to insure that each step in the motion of the control lever produces the same increase in the number of engine r.p.m.

How to Determine Control Curves

Although it is possible to determine theoretically the relation between throttle opening area and speed of rotation, and, consequently, the transmission ratio required for every point of any particular control curve, the graphical method is simpler and much quicker. In Fig. 3 the different methods of connecting single armed levers lying in the same plane are represented diagrammatically, A and B being for rotation in the same direction, and C, D and E for rotation in opposite directions. The range of motion of the lever at the right, which is regarded as the driving member, is divided into four equal parts, and the corresponding positions of the left hand driven lever are indicated by small circles. If the levers are connected symmetrically, as at A, the transmission is uniform, the divisions of both arcs of motion being equal. On the other hand, if the connection is made so that the levers lie nearly at right angles instead of parallel to each other, as at B, equal divisions of the right hand lever correspond to very unequal divisions of the left hand one. The total range of motion is somewhat smaller and the transmission of motion is far less favorable, in that resolution of the transmitted pressure into its components results in increased bearing pressure and the influence of any possible slackness in the pivots is increased. However, since in the regulation of throttle opening the forces transmitted are very small and play in the pivots may be eliminated by the use of a counterspring, these matters are of no great practical importance.

With opposite directions of rotation of the two levers, the transmission is substantially uniform if the location of the link in the middle position corresponds to the common inner tangent to both arcs, as at C. By shortening the link, as at D, or lengthening it, as at E, the transmission ratio becomes non-uniform, in that, with the shortened link, the motion of the driven lever is at first large and then becomes smaller and smaller, while with the lengthened link the reverse relation holds, as may be seen from the diagram. It is necessary to become thoroughly familiar with these relations—which are not directly obvious—before attempting to determine the proper position of the levers of a carbureter throttle control.

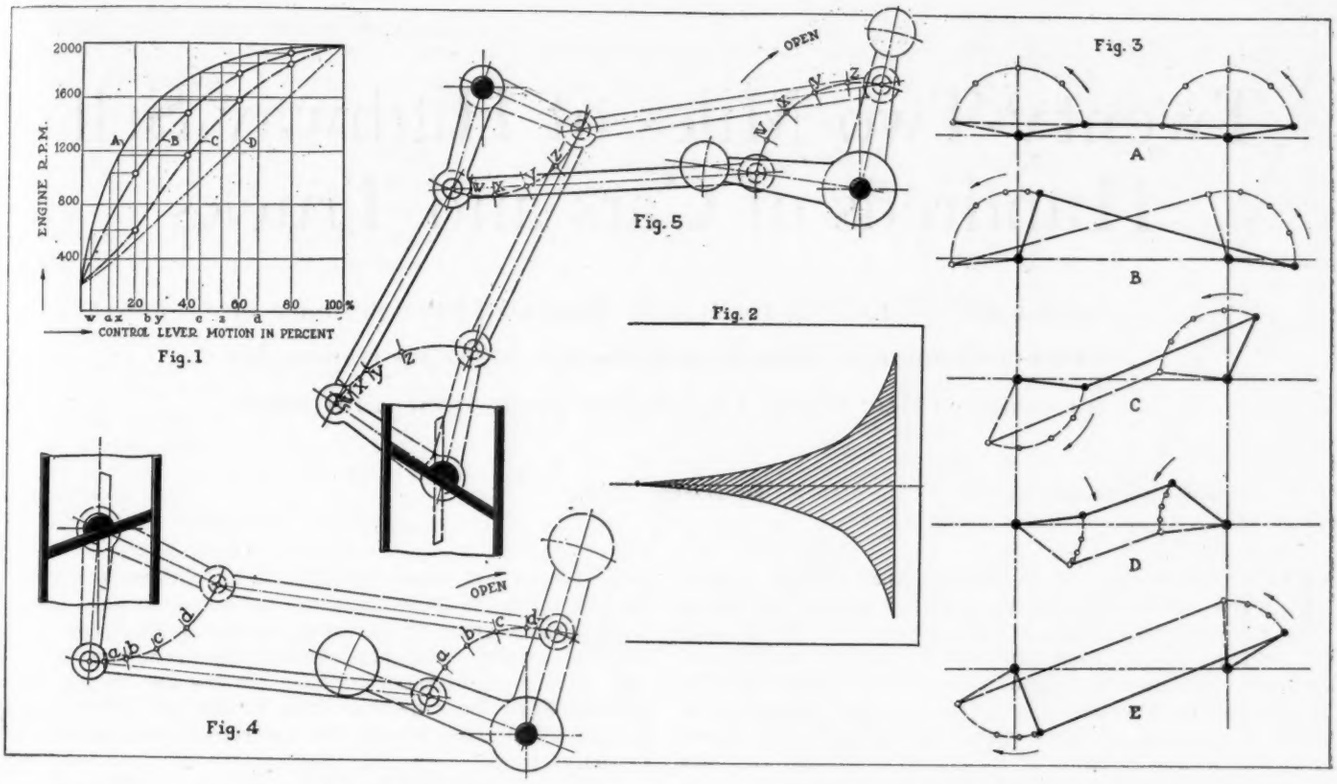


Fig. 1—Control curves with different transmissions
A—Control curve corresponding to direct operation of butterfly valve
B—Control curve for lever transmission according to Fig. 4
C—Control curve for double lever transmission according to Fig. 5
D—Ideal control curve

Fig. 2—Throttle valve with profiled port

Fig. 3—Diagrams of lever and link connections

Fig. 4—Control with simple lever connection

Fig. 5—Control with an intermediary lever

The effect becomes plainer by reference to Fig. 4, which corresponds to Diagram D of Fig. 3. In practice there is, of course, a greater distance between the throttle lever and the control lever, and besides those shown there are additional levers and links, which, however, if they are arranged symmetrically, do not influence the transmission and may, therefore, be neglected. The full lines indicate the idling position. The range of motion of the control lever is divided into five equal parts, of which each, therefore, corresponds to 20 per cent of the total motion. If the control lever is moved to point *a* (20 per cent) the throttle lever moves through only 11 per cent of its total range. On the contrary, the last 20 per cent of control lever motion, from point *d* on, corresponds to 35 per cent of throttle lever motion.

Effect of Variable Transmission

To bring out the effect of this variable transmission, there are plotted in Fig. 1 on the axis of abscissas the thus found displacements of the throttle lever in per cents. A vertical line is drawn to the intersection with the control curve and this height is transferred to the axis of ordinates which corresponds to the control lever position. If this is carried through for the positions a, b, c, d, the dash control curve B is obtained which represents an improvement as compared with the speed curve A, but is still very far from the ideal curve D.

If the transmission ratio variation is increased by introducing an intermediate lever in the link which is out of parallelism with both of the other levers, as shown in Fig. 5, the two effects will be additive. With the arrangement shown in the drawing, the first 20 per cent of the control lever motion, to point w, corresponds to only 4 per cent throttle opening, while the last 20 per cent of control lever motion, from point z on, corresponds to 47 per cent of throttle opening. The effect is shown by line C in Fig. 1, which was obtained in exactly the same way as line B. Such a control curve approaches so closely to the ideal curve D that it meets all practical requirements, more particularly because, with few exceptions, the arrangements found on present cars are not nearly as favorable.

Non-Uniform Transmission

Besides the ordinary lever connection, there are other mechanisms which may be used to obtain the desired non-uniform transmission, such as roll lever combinations, eccentric gears, cam drives and crank motions. Of these only the crank motion is at all likely to see practical application, for the reason that it also is quite simple and gives substantially the same opening diagram as Fig. 5. It is generally unnecessary to resort to any of the other mechanisms mentioned, as the connections in any case comprise lever arms, which it is only necessary to give a proper angular offset in order to obtain satisfactory control characteristics. Painstaking work is necessary in this connection, and often several layouts must be tried out before the best solution can be found. To direct the attention of designers to this point, which in the past has been very much neglected, is the object of this article.

THE city of Madrid has passed a resolution in favor of purchasing 12 motor ambulances at a cost of 250,000 pesetas. It has declared its intention to reconstruct the street-cleaning service, and will purchase motorized street sweepers, sprinklers, and rubbish wagons.

Twenty-Two Miles of Highway Sell Hundreds of Cars and Trucks

Sales value of surfaced roads well illustrated by experience of Indiana community. Analysis shows new highways responsible for motor vehicle sales. City dealers profit from rural roads.

By Harlow Hyde

TWENTY-ONE AND A HALF miles of new county hard surfaced roads have sold hundreds of automobiles, established a very successful Ford agency in a village, inaugurated half a dozen service garages in the territory, brought three modern brick and concrete filling stations and about ten other roadside pump stations. The story of these roads will interest the executive who wants to know if hard surface roads are real automotive trade builders or just nice things to ride or haul on.

These are rural roads, and yet two-thirds of the benefits to automotive merchants have gone to city dealers who rarely trouble their heads about promoting rural roads. The twenty-one and sixty-three hundredths miles form a compact system running north over three routes and with a new connecting crossroad just finished this fall. They lie to the north of Indianapolis and are connected by paved streets with the city. Four years ago there was not a mile of hard-surfaced road in this north section of the county, which now has 150 miles of hard-surfaced rural road built by county authorities. Before the construction of these twenty-one miles, gravel roads were all that the region knew. It is a pretty country, fairly rich, and yet the farmers had not bought motor cars to any great extent. As a distant suburban region for the expansion of the city and those who wanted to live in the country the region had been well known to many people. But the dust of the gravel and its outrageous condition in many seasons of the year made it unpleasant for the city people, and of very little joy to those who lived on the country-side.

FOUR years ago there was not a subdivision of rural suburbs laid out. There was a small section on both sides of the White River where a few people had country or summer homes. Scarcely an all-the-year country home of a city man was to be found in the region. Contrast this with the present.

There are six subdivisions that have been opened this year, all outside the old city limits. Three of them are practically sold out. All the people who will live in those restricted districts will have to depend upon automobiles for transportation. The summer colonies of the River section have increased until one of them counts more than 1200 summer residents, all of whom depend upon motor cars. Hundreds of cars have been bought since the hard roads began to go in about two years ago. More than 2000 people live on the River from 5 to 7 miles beyond the city limits; and at least fifty families have converted their summer homes into all the year places from which they ride to and fro every day. Many of these families have from one to three cars. A few large country homes have already gone up in farm regions away from these summer colonies, and they will average from two to four cars each, most of them additions to the one vehicle that sufficed when their owners lived in the city. The large part of all the cars bought for the region were purchased in Indianapolis.

THERE are three bus routes that now use these roads. Two of them go to Noblesville, about 25 miles north. There are at present three buses on these routes, with more in sight when the farther north stretches of one of the roads is complete. Another bus line that runs to one of the series of summer colonies has purchased seven light delivery trucks equipped as buses. Three of these were used this year, and they will not average more than a year of such service, after which they are converted into delivery use for ice, etc. There are ten speed wagons and light trucks bought by the region. A huge gravel pit has gone in since the hard roads made hauling possible. From five to ten huge 5-tonners operate from this place and several lighter types, all bought since the roads went into the region.

The farmers have increased their motor vehicle equipment, and a few of them on or near these roads have bought trucks this year. Consolidated schools have bought three buses.

One block of farm property that lies in an angle between these roads has increased its motor vehicle equipment from four to sixteen. Two city families have constructed country homes in this block. They operate six cars between them, four of them additions to former holdings. All but four of these vehicles sold in this small farm section were bought in Indianapolis.

Practically all of these road profits noted have been automotive profits. What of the new three-story consolidated school that gives the country children as good schooling as the city schools with no crowding at all, and with bus delivery to the school in all sorts of weather? These people are not going to move to the city for school advantages. The cars their families buy will get more use than those of the city men. They will wear out faster, and they will always be motor vehicle users.

The little village of Allisonville, that lies 10 miles from the city, has blossomed into life after years of slumber. When founded more than eighty years ago it was thought to be the future site of the metropolis. The railroad went another way. The hamlet has been cut off for years. Now it is repainted. One general store has been enlarged and

restocked, and trade increased greatly. This place and two others maintain filling pumps. There is also a garage. Refreshment places have been established, and the people of the hamlet and the near-by farms have gone in for cars. In five years the wise men say it will be a growing suburban town. All because of the new cement road, for all the twenty-one miles except two and a half are of this type.

COUNTING but 600 cars in the summer and country colonies that go to and from town each day, these vehicles deliver 12,000 vehicular miles of travel each day. This is fully four times as much as the same number of city cars would deliver in taking the men and the women to business each day. Every month at this conservative figure some of the vehicles must wear out. New cars for the dealer to sell. The suburbanite is always the best customer if he drives back and forth daily. Here is a demand that will never be fully satisfied. Tires, supplies, accessories! How much better customers are these habitual drivers than the city fellows who use their cars but occasionally for business driving!

With this slight digest of the automotive profits and sales from the twenty-one miles of new hard-surfaced rural roads, one would think that every dealer in the region should be a good roads man, and working for more of them. Far from it, this city and region has not had a good roads meeting in years. The automotive men have not urged these or any other roads of which we have heard. It has been left to the farmers, the real estate men and the county officials to found and build these roads. Our section is full of anti-highway yap, and the dealers have not (to anyone's knowledge) gone into printed record against the calumnies heaped on hard-surface roads by some of our politicians and anti-highway interests. Perhaps they are too busy selling cars and supplies to such people as they of whom we have talked. When the hard surface road punches the automotive cash register, and when it is easily proved that the highways are to the advantage of the public, it would seem that the dealers might at least put a little energy into selling the public and their customers road sense. Such effort would redound greatly to the dealer's advantage.

Good Roads Campaign Makes Strides in Sao Paulo, Brazil

THE highway program of São Paulo, which has been extensively developed during the last two years, comprehends the construction of a network of roads leading out of this city to provide rapid and easy communication to all parts of São Paulo and to the adjoining states. Five leading roads under this program have either been completed or are in process of improvement.

The road to the coast, which has as its terminal the seaport of Santos, has been built and in use for some years. The route to Minas Geraes is the farthest advanced of the other four, as it has been opened for traffic to Ribeirão Ireto, within a short distance of the State boundary line. This highway, the construction of which has been previously reported, is 344 kilometers in length and is an excellent and picturesque highway leading through some of the richest parts of the coffee country.

Work is well under way on the remaining roads that lead to Matto Grosso, Rio de Janeiro and Parana, and it is estimated that an average of 100 kilometers has been thrown open for use on each of these highways. The Matto Grosso road has been carried to Itú and the Rio de Janeiro highway is already past Jacarehy.

All of these roads are excellent not only for touring and automobile pleasure driving, but they will carry as well an immense traffic for business and commercial purposes. All in all, some 1000 kilometers of state roads are being improved.

The work of the Assocacião Permanente de Estradas de Rodagem (Good Roads Association), which is the center of the highway campaign and which devotes its entire attention to the promotion of road improvement, has been an important factor in building up the present fine system. The association maintains permanent connection with the various states of the Republic, with road organizations and other institutions, and in this manner it is serving not alone São Paulo but the entire nation.

Steering System Stresses Reduced With Transversely Raked Pivots

Layout in which knuckle axis produced strikes road in central point of tire contact is also said to decrease greatly effort required in steering, especially when front wheel brakes are locked. Tendency of wheels to toe out is also lessened.

By Otto M. Burkhardt

SEVERAL articles dealing with steering systems of motor vehicles which have appeared in recent issues of AUTOMOTIVE INDUSTRIES have aroused considerable discussion among engineers and show clearly the need for further study of the subject. The following notes are intended to clear up some points on which in general engineers do not seem to agree.

In one of the articles in AUTOMOTIVE INDUSTRIES of Oct. 5, 1922, we read:

"The second common fallacy is that inclining the swivel transversely, so that its axis produced strikes the road at central point of tire contact, neutralizes the turning moment about the swivel due to rolling resistance. It reduces it a little, but so little as to be of hardly any moment."

This conclusion is very misleading and correct only if we assume that the rolling resistance is merely the resistance of the bearings upon which the wheel is mounted. We must bear in mind, however, that by far the larger forces tending to interfere with the steering have their origin at the point of contact between the tire and the road. The following example will make this clear:

A wheel carrying a load of 1000 lb. when mounted on first-class anti-friction bearings is subject to a bearing friction moment of about ½ lb. ft. when turning over at a rate equivalent to a road speed of 25 m.p.h. If f is the tangential force required at the periphery of the wheel to overcome the bearing friction and R (= 17 in. = 1.417 ft.) is the radius of the wheel, we have the following equation:

$$f \times R = M = 0.5 \text{ lb. ft.}$$

From this follows that

$$f = \frac{0.5}{1.417} = 0.353 \text{ lb.}$$

This is indeed a small force—so small that we may say that bearing friction is negligible. If we agree on this, then the quoted statement ceases to be true.

Vastly greater forces are acting at the point of contact between the tire and the road. For instance, on the best level roads, the resistance between tire and the road for 1000 lb. load at a speed of 25 m.p.h. would be about 10 lb., which is considerably more than the bearing friction. Moreover, if an obstacle is encountered, similar to that shown in Fig. 1, it is obvious that the instantaneous center of rotation will be at A. The impact is balanced by reaction of the wheel bearings. The direction of the force F is toward the center of the wheel. The magnitude of this force must exceed the weight on the wheel, in this case 1000 lb., if the wheel be raised. Consequently, a force of 0.353 lb. can be safely neglected.

If we resolve the impact force F into components W^1 and H, it will at once be evident that the wheel cannot surmount the obstacle unless W is at least equal to W^1. W and W^1 we note form a couple the moment of which is negative (counter clockwise). This couple is balanced by the couple H and H^1. Hence $H - H^1$ must be equal and opposite to $W - W^1$. H^1 is the horizontal component of the reaction of the wheel spindle against the bearings.

In the case of Fig. 2, which illustrates an axle design with vertical swivel pin, we note that the weight W is imparted to the wheel in a truly vertical direction. The force W is then parallel to the vertical component of impact force F. The horizontal component of F, as previously mentioned, determines magnitude and direction of the force H. The reaction of H is the force H^1, which originates from the momentum of the car and is imparted through the springs to the front axle. The linkage through which H^1 acts is free to rotate about axis B-B of the swivel pin. It is therefore evident that with the design under consideration, H^1 will set up a moment $H^1 \times a$. This moment if not resisted through the tierod by an equal and opposite moment, originating from the other wheel, must be absorbed within the steering gear or by the driver on the steering wheel.

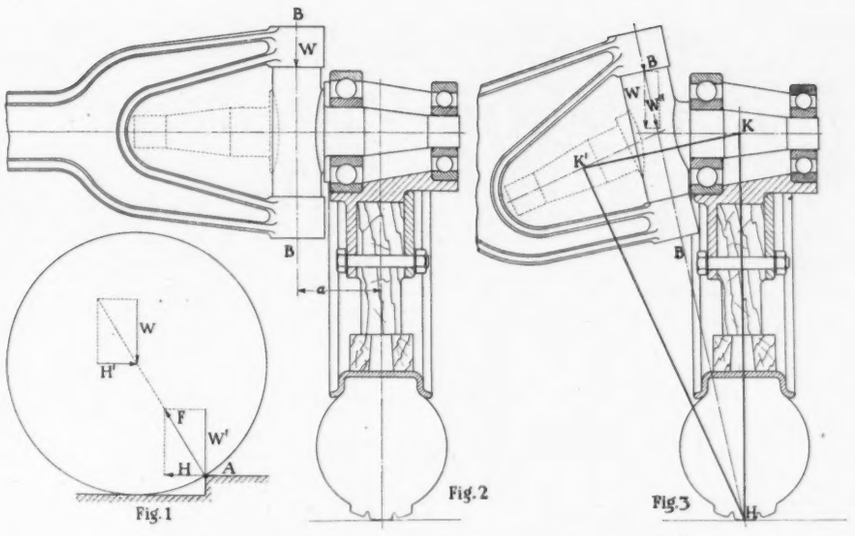
Center Point Steering

Fig. 3 represents a design in which the king pin is inclined tranversely so that its axis B-B intersects the road at the central point of tire contact with the road. This type of design is sometimes called center point steering. This term suggests that we are not taking into consideration the fact that the tire does make contact with the road over a measurable area rather than at one point. The two designs, Figs. 2 and 3, represent extremes. At one end of the scale the swivel pin axis is parallel with the plane of the wheel. At the opposite end transverse inclination of the swivel pin axis is at a maximum, for further inclination would certainly bring difficulties when oversize tires are fitted.

In Fig. 2, the load W is transferred from the axle to the steering pivot through a horizontal surface, whereas in Fig. 3, the load W is transferred to the wheel through an inclined surface. The force induced by W must act normal to this inclined surface, as indicated by W^{11} in Fig. 3.

The forces H and H^1 necessarily fall in the same plane as W^{11}. Hence H^1 does not act through the steering pivot on a lever of length a. In other words, we have $H^1 \times a = 0$. Within reasonable limits, a design such as that in Fig. 3 will resist road shocks which in other designs are counteracted by the steering mechanism or the driver. With the design of Fig. 3, there is no continual tendency for the wheels to toe out. Excessive fluctuation of these forces induces wobble if the design is not well carried out.

If front wheel brakes are fitted to the axles here under consideration the force H may well amount to 600 lb. per wheel when the wheels are suddenly locked. Taking first the design shown in Fig. 2, assume that the distance a is 2½ in. If we now wish to turn the wheels while the front wheel brakes are locked through an angle of 90 deg., let us say from extreme right to extreme left, we would have to do the work.



Diagrams showing stresses involved in steering systems with vertical and with transversely raked pivots

$$W = 600 \times 2\tfrac{1}{2} \times \frac{\pi}{2} = 2355 \text{ in. lb.}$$

Inasmuch as there are two wheels in contact with the road, the driver has to do twice as much work, namely, 4710 in. lb.

With a steering wheel of 18 in. diameter and a mechanism which necessitates 2¼ turns of the wheel for the maximum wheel travel, the following force would be required at the steering wheel:

$$P \times 18 \times 2\tfrac{1}{4} = 4710$$

Hence $P = 37.1$ lb.

Assuming that the efficiency of the steering mechanism is about 75 per cent and that two hands are used for steering, we obtain the force necessary for one hand,

$$P = \frac{37.1}{0.75 \times 2} = 25 \text{ lb.}$$

This is approximately what would be required for a car with a knuckle having a vertical pivot as in Fig. 2.

Now consider Fig. 3. We again imagine that the car is standing still and that the wheel is restrained from any movement except rotation about the swivel pin axis *B-B*. Then every point of the wheel must travel in a plane perpendicular to the axis of rotation. When turning the wheel of the steering mechanism, the point K of the steering pivot will travel to position K^1; its path will describe the base of the cone $K\,K^1\,H$. The apex of the cone is H and the axis is that of the center line of the swivel pin *B-B*. It is obvious that while turning the wheel about axis *B-B* with the front axle held stationary, the point H will not move, consequently no effort should be required at the steering wheel to turn the wheels from one extreme position to the other. In reality, we do not have a point contact between the tire and the road. For this reason, there will always be a frictional force between tire and ground and, as the mechanism is not 100 per cent efficient, it will certainly require some effort on the steering wheel to accomplish a change in the position of the wheel. It is clear, however, that in principle there is a marked difference between the two designs under consideration.

It is an acknowledged fact that with both center point and vertical king pin steering there is difficulty in maneuvering a car while at rest or in close quarters. It cannot be conceded that cars with vertical king pins are easier to maneuver under such conditions. To explain the reason for this, let us assume that the distance a, Fig. 2, is equal to 2½ in. and the contact area in a radial direction taken from the center of the king pin (d) is equal to 3 in.; then, for a turning angle of 90 deg., the relation of the sliding motions will be $R = \dfrac{a + d/2}{a - d/2} = \dfrac{2a + d}{2a - d} = 4.$

In other words, the contact points remote from the king pin must travel four times as far as the points near the king pin, from which it may readily be seen how much sliding will take place. As long as there is sliding we have to overcome the friction of rest, which is very much larger than the friction of motion, for both types of steering gear. As a rule, the wheel is swung around in a series of angular movements; every time it is set in motion—and hence broken loose—an appreciable angle is turned. A new grip is then taken and the cycle repeated.

United States Backward in Passing National Air Laws

FORTY countries have national air laws regulating the operation of civilian aircraft and designed to decrease flying accidents due to reckless piloting, according to a survey which the Aeronautical Chamber of Commerce of America to-day forwarded to the Department of Commerce.

The survey says that twenty-six nations which ratified the International Air Convention drawn up following the armistice, have established national legislation providing for safe and sane flying within their own borders. Fourteen other nations have various kinds of national air laws.

Of the remaining countries on earth, those which have not yet passed air laws tending to safeguard the passengers and the lives and property of the public include Abyssinia, Persia, Bhutan, Nepal, Oman and the United States.

All aviation organizations have co-operated in urging the passage of the Wadsworth Bill providing for a bureau of civilian aeronautics in the Department of Commerce. The measure, if it became a law, would regulate all civilian flying, provide penalties for reckless pilots and purveyors of unsafe machines and would prescribe means for protecting property on the ground.

Manufacture of Jewett Sedan Shows Progress in Pressed Metal Work

Pressed shapes, formerly made in two or three parts, now made in one piece. Deeper draws make possible new methods in production. More accurate work reduces hand fitting to a minimum. Body made in three plants presents special problems.

By J. Edward Schipper

BETTER handling of pressed metal work has been responsible for many of the economies effected in closed body building during the past three years. Pressed shapes, formerly made in two or three parts, can now be made in one piece because deeper draws are possible and because production men have a more complete knowledge of handling sheet metal work in the dies and of conditioning the metal before the stamping operation. Pressed steel panels are being made more closely to form than in the past and, consequently, little hand fitting is necessary in applying them to the wood framing. This production progress has made it possible to employ progressive assembly methods in body building more fully than ever before.

Improved pressed metal work is resulting in the elimination of a great many wood parts and in the substitution of pressed metal parts in their place. The latter are not only lighter and more rigid, but are also more readily made interchangeable.

A good example of modern body production methods is offered in the manufacture of the Jewett sedan. This body is made in three different establishments. The pressed steel work is handled by the J. W. Murray Mfg. Co., the framing and assembling of the panels to the frame by J. C. Widman & Co., and the trimming and upholstering by the American Auto Trim. The pressed steel work handled by the Murray company is of particular interest in view of the fact that it must be adapted to the progressive assembly system in use at the Widman company. To make large pressed steel parts so accurately that they will fit into the progressive assembly system of another concern would have been considered almost impossible not long ago. The object is accomplished in this case by accurate die work and by holding the various parts to shape and dimension by jigs constructed with great precision.

Stamping the Wheel Housing Panel

One of the most interesting stampings in this body is the panel which forms the wheel housing (Figs. 1 and 2). It has a 4¾-in. draw over a sharp edge. This is the deepest draw utilized in any of the stampings made by this concern and is probably very close to a record in this particular type of operation. With the two-wheel housing panels and the back panel forming the rear of the body, three pieces are used in place of five. Formerly it was considered impossible to make this deep draw over the wheel housing and, as a result, it was necessary to weld two stampings together. The present deep draws are accomplished by first passing the sheet metal through breaking rolls to eliminate stretching strains.

Another interesting example of very good pressed steel work is in the instrument board. The embossing and complete shaping of the board is accomplished in two draws.

The door panels are made in one draw with the molding pressed in (Fig. 3). In a subsequent operation these are pierced, flanged and expanded, and made ready for the door framing. The finish cowl assembly in this body consists of a top and two side pieces. The steel dash inside the cowl assembly is spot-welded in place. A ventilator lining also is welded into place on this assembly.

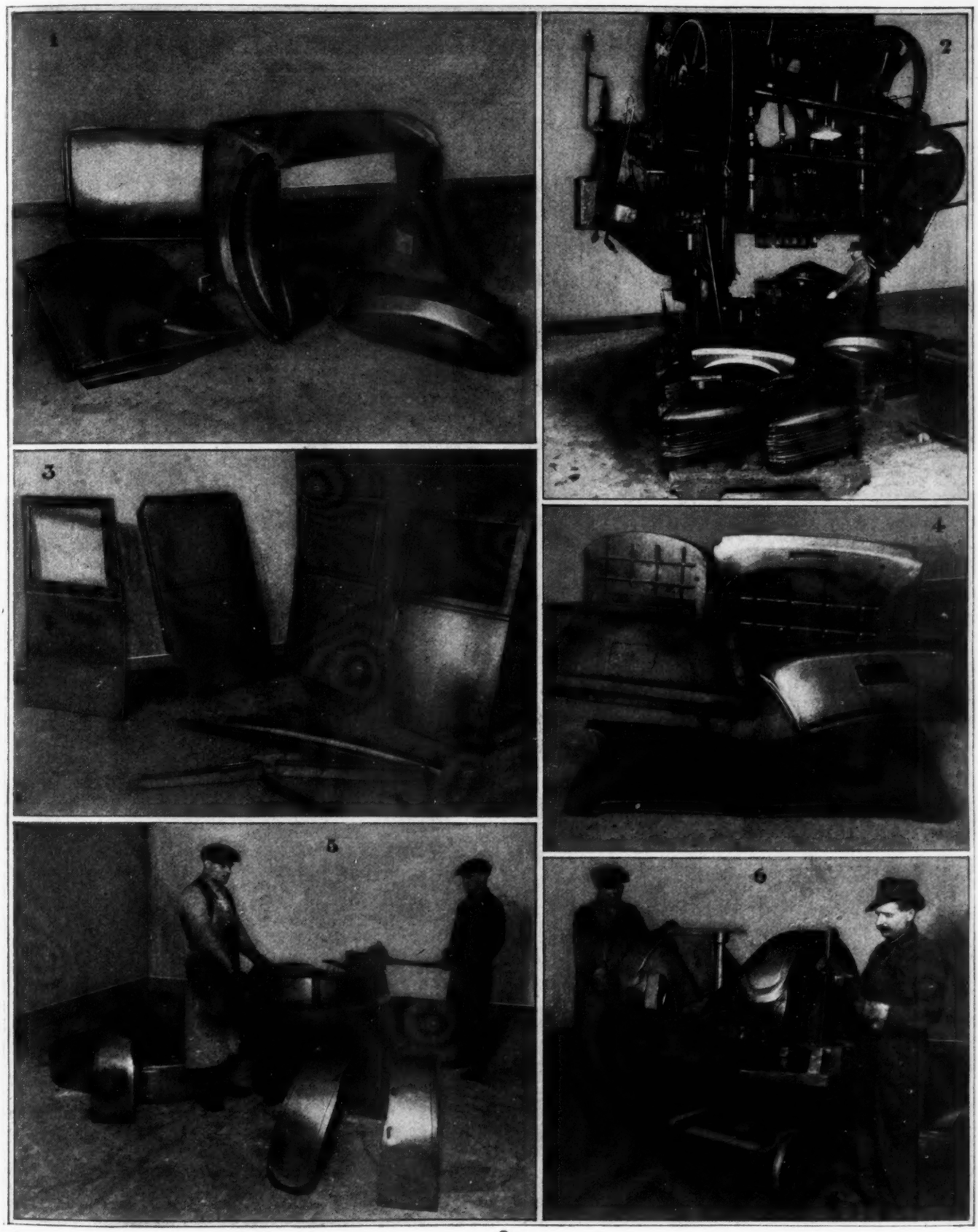
The two side panels, left and right, for the finished cowl are drawn together and cut apart afterward. They are then welded to the top piece to form the complete cowl assembly (Fig. 4).

Pressings Have Intricate Shape

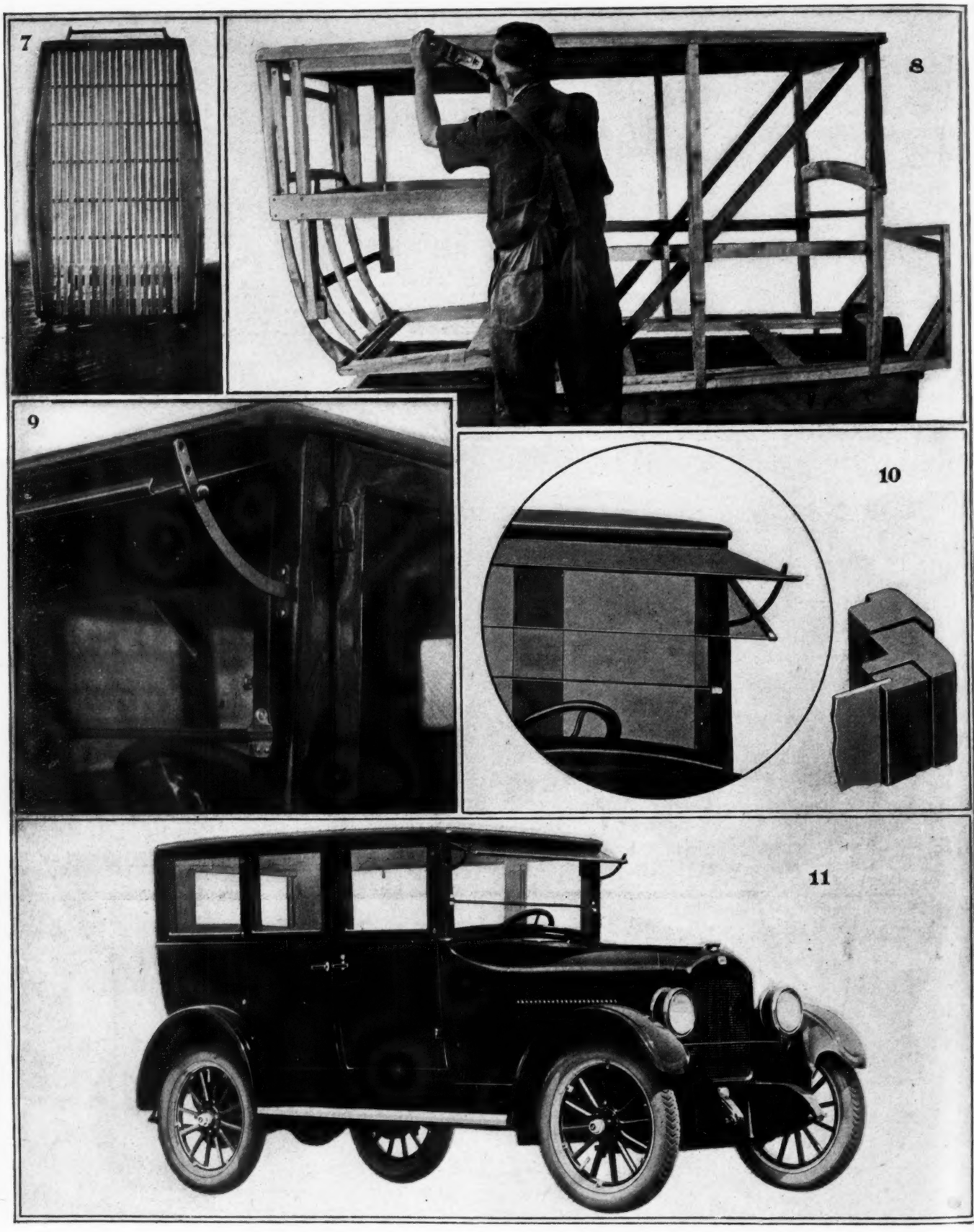
Many of the pressings are of rather intricate shape and are quite advanced examples of the pressed steel art. A good part of the work, particularly in the larger pressings with the deeper draws, is handled on a 500-ton Bliss toggle press. The equipment also includes a 300-ton Bliss press capable of seven strokes per min. and a 300-ton Ferracute capable of 9 strokes per min.

The pressed steel parts leave the Murray company drilled and ready to be put on the wood framing. This, of course, requires accurate jig work that the holes may come where they should when the metal sheeting is put in place. Some very interesting jigs are employed, a good example being the jig for the fenders, Fig. 5. The dimensions are checked very thoroughly. The contour of the fenders is checked by arms on the jig itself. The fender is placed on the jig in about the same position as if it were being bolted on the car. There are gages, Fig. 6, for the outside and inside dimensions, as well as for the curves. There is also a jig for lining up the wheel housing bolt holes and another for use on the press, which puts the holes in the gusset piece known as the fender wing or tail piece.

Much of the pressed steel work which is sent to the Widman company for assembly is in the nature of subassemblies. The back and side panels are welded together, as well as the ventilator opening on the cowl



1—Assembly of the back panel and the two side panels with the wheel housing welded together ready for shipment to the body assembly plant. 2—Five-hundred ton Bliss press putting a 4¾-in. draw for the wheel housing for the side panel. 3—Finished door panel and blank panel. The blank shown in the center is the result of one operation on the press. 4—Cowl assembly showing the blanks for the dash, cowl top and sides. The left and right sides are stamped out together and then cut apart. 5—Jig for putting in bolt holes. The jig is curved to conform to the finished shape of the fenders so that the holes are properly located. 6—Gage for checking fenders as to contour, length, width and mounting dimensions



7—Roof of the Jewett sedan. It is a very complete wood frame and acts as a part of the body structure. 8—Final operation on the wood frame. 9—The windshield is built into the front pillar and the visor is turned up at the forward end to act as a rain shed. 10—To keep the front pillar as narrow as possible and to cut down the obstructions of the view of the windshield, the windshield frame fits into a rabbett in the front pillar. 11—The finished Jewett sedan. Note the deep door paneling, the molding about the belt of the body and relatively narrow pillars with low, flat roof

and the lining piece, and the fender and fender tail piece. Practically all of the stock employed is 20-gage material.

At the plant of the Widman company, where the wood framing is put together, the production practice is similar to that of most body framing shops, with the possible exception that a little further effort has been made to utilize progressive assembly methods. Instead of following the usual practice of having one or two men frame an entire body, the production run is put through by having individual workmen fit certain pieces in place and then pass the frame along to the next operator. Greater speed is secured by handling the work this way. In the first place, the men become more expert in handling their individual jobs. In the second place, it is possible, if desired, to use the gang system of handling the labor so that the workers are paid in proportion to the number of jobs which come off the end of the line. Such a system of body framing work is possible, of course, only where a reasonably large production is maintained in straight runs.

The actual framing structure as employed in the Jewett sedan is noteworthy for one very definite point. An unusual amount of wood is used in the roof of the body for a sedan of this type. The roof, being the most remote point from the neutral axis of the body, is subject to great stress and is the part which ties together the entire closed body. This has been recognized in the system for framing this sedan (Figs. 7 and 8), and the roof woodwork is rather more complete than in the usual soft top.

The structure of the front pillar into which the windshield is mounted is another feature of interest in this body (Fig. 9). The windshield fits into a notch in this pillar, which greatly reduces the blind area in front of the driver as compared with the usual practice of putting the windshield frame inside the front pillar. The sketch (Fig. 10) shows the method of arranging this front framing. The visor has at its forward end a turn up acting as a rain catcher, which acts as a scupper along which the water is carried and allowed to drain off the side.

The effort to stamp in the molding on this body has been abandoned in favor of a bead which is afterward applied as a separate bead piece. While the advantages of the formed mold are recognized, particularly in view of the fact that there is less tendency to streak the finish below the mold, the difficulties in assembly and in handling the bodies through some of the other phases of production were in this case sufficient to offset the advantages.

The trimming, which is handled by the American Auto Trimming Co., is also applied on a progressive basis. In the American plant the work is handled by carriers mounted on circular tracks. Each circle of track is sufficient to handle the trimming work on about fifty bodies per day. So far as the actual procedure in trimming is concerned, there is little departure from usual practice, the chief exception being that each individual workman handles a particular job instead of two or three men trimming and upholstering an entire job, as is more common.

New Hy-Lift Truck

ONE of the most recent developments in the material handling field is the Baker Hy-Lift truck which has been put on the market as an addition to the line of Baker industrial tractors and trucks. This machine is in effect a combined electric truck and portable elevator. It is built to carry material and also to raise it, for the purpose of placing loads directly on drays or in freight cars from the ground, for tiering packages or for unloading into upper tiers of bins. The truck is capable of hoisting a two-ton load to a height of 6 ft. from the floor by means of a cable hoist. Briefly described, the truck consists of an electrically-driven truck mounting two vertical I-beam members which act as a track for the lifting carriage. This carriage runs on four steel wheels and carries the load platform which is hinged to it. The hoist is a two-drum type, with electric motor drive through a forty-to-one worm reduction. An automatic limit switch opens the power circuit at the limits of travel and the load is held in any position by means of a solenoid brake. The controller for this mechanism is mounted adjacent to the driver's platform.

Baker Hy-Lift Truck used for loading motor truck

THE need for extension of American patents on automotive products in foreign countries is emphasized in a letter received by the Department of Commerce from an American Consul in Portugal. It is reported that certain firms in Portugal buy American truck bodies and parts and use them for patterns.

The bodies and parts are then made locally at prices averaging from one-half to one-third of the present American prices. Automobile manufacturers are warned, for their own protection, to secure patent rights in all European countries.

Under the Bern treaty American manufacturers are given one year grace in which to file application in European countries, for patents, after application has been made in the United States.

Cuban Motor Vehicle Sales Now on Up-Grade

Financial and business condition of country improving as sugar and other staples reach higher price levels. Unsold motor vehicle stocks no longer severe handicap to sales. Highway construction needed. Retailers must have financial backing to go ahead.

A CAREFUL survey of automotive conditions throughout Cuba, but more particularly in the city of Havana, gives rise to an undoubted feeling of rising confidence, although it is not to be expected that sales conditions will change for the better with any startling rapidity. The majority of dealers and distributors, however, feel that better business is on the way, and the present outlook is much more optimistic than has been the case since the prices for sugar and other Cuban products took such a disastrous slump in 1920.

The facts about the automotive industry in Havana are that several firms already have experienced a satisfactory volume of business. This, unfortunately, is not everywhere the case, as some firms have scarcely made the sale of a new car for many months. The companies whose business has prospered are those which are well financed, strongly entrenched in the trade and represent well and widely known lines. They are, of course, in an exceptionally good position to take advantage of any change in conditions, and also they have been sufficiently powerful to keep sales efforts under way without any let-up during the depression period.

As in other countries, sentiment among members of the industry is somewhat divided, but it seems apparent, as the result of a detailed study of Cuban business conditions, that automotive sales should improve materially. The financial situation has brightened a great deal, there has been a relaxation of the strained conditions of credit which have been such a drag on all commerce, and, above all, the chief crops of the Island are at satisfactory price levels. Sugar, which forms the backbone of Cuban economic structure, is commanding prices well above the cost of production. The hold-over stocks from the last crop, which was the largest the Island has ever produced, were sold at a good figure and the new crop is awaited with the expectation that it also will be large and command good prices. As goes the sugar market, so goes prosperity or its failure in Cuba, and certainly every indication at the time of writing points to a satisfactory condition for the new crop.

CUBA is the sugar center of the world and there can be no doubt but that it will continue at least for many years as the largest producer. Thus, so reason many Cuban business and automotive men, the Island is confronting a period of long prosperity. It is hoped among the clearest thinkers that nothing of a boom or a sudden expansion will come but that present conditions will slowly become better, carrying with them a satisfactory volume of automotive sales for those companies which conduct their affairs sanely and effectively.

Many automobiles have been sold in Cuba since the boom broke two years or more ago. Stocks were top-heavy at that time, particularly of some makes of cars and trucks, and these were thrown on the market at extremely low prices. The dealers suffered the same difficulties that were met with in other lines of trade and in other countries, but these hold-over stocks have been liquidated fairly well. Some few companies yet have a number of unsold cars and there are numerous trucks that have not gone into the hands of owners and users. The truck situation is not so clear as that in the passenger car field, but of passenger cars the unsold stocks are not now considered as a great handicap to present sales.

MUCH has transpired here in recent months. Some companies have gone out of business and others are not certain of the future. It is possible to point out firms which have been forced to seek smaller and less commodious quarters, and there have been many changes, both in personnel and in financial control. But the unfortunate experience of these companies, much as their troubles are to be regretted, does not mean that the automobile business is not now on a solid foundation.

The sales of accessories also have shown an improvement, although no revolutionary changes are to be noted and none to be expected. More cars are in operation to-day than was the case a year ago and naturally accessory sales are better. Tires are being sold in heavy volume, as tires are severely used here, and competition is very strong.

Underlying the automotive markets of Cuba are merchandising problems of a character vital to every concern. These, perhaps, are the same as are encountered in other countries, and they are as important in one locality as in another. The chief of these may perhaps be given as finances. The companies which have best weathered the past months are those which have been the strongest financially. Cars are being sold very generally on deferred payment terms, often of long duration. This is particularly true of some of the higher priced cars, making it necessary for the local companies to be ably backed if they are to compete successfully. It is scarcely possible to start a paying automotive business on a small amount of capital any more.

The banks and financial houses are rather reluctant to come to the assistance of the automobile companies. This is not true in every case, but the banks here have been very conservative in regard to extending their facilities to all lines of industry. Perhaps the automotive industry is suffering just the same as other lines of trade, but the impression among the dealers is that the banks frequently discriminate against them.

Probably the reason is that the bankers have not been converted to an understanding of the essential utility value of the automobile as a vehicle of transportation. They may still regard it merely as a luxury that can be dispensed with in times of financial storm. The dealers themselves, if the bankers are discriminating against them, should take some of the blame on their own shoulders and seek to remedy the condition by presenting the true facts to the financial houses. The automobile, of course, is to-day a great factor in Cuban business and economic life. For one use of the automobile for pleasure purposes, there are many for business purposes. For instance, many business and professional men are now enabled to live in the suburbs because of the transportation benefits of their automobiles. If the bankers really understood just what the automobile has come to mean in the daily life of this country, how much it has contributed to the economic progress of the Island and what part it promises to take in its future development, they probably would be much more inclined to treat the automotive industry as well as they do other lines of commerce.

Merchandising methods have changed to a certain extent, but improvement might be effected in many directions. Only a comparatively few companies are advertising their products on a strong basis; those which are, it is needless to state, are the four or five most successful ones. The same condition is true practically in regard to exhibition and salesmanship. The methods of some companies are quite weak in this direction. The salesrooms of a number of concerns are difficult to find, cars are sometimes poorly displayed and better service could be rendered. This must be stated with well-known exceptions, as some of the sales and service stations here are of the finest sort, their maintenance work is of high quality and customers are given the best kind of treatment. Some of the jobbing firms particularly have developed satisfactory sales methods and are developing trade with much energy.

It is possible to point out companies handling meritorious products that cannot display them to possible customers, as these products have not been stocked for many months. The difficulty in competing with other concerns is obvious.

THE trading-in of used cars is a fairly common practice here. This has reached such proportions that, at times, it becomes a problem to dispose of the traded-in cars. Where the appraisal values of the old cars have been kept low enough to make it possible to move these vehicles, the used car problem is not a handicap and the trading-in privilege has been used as a great factor in keeping the business under way.

Whether an automobile exposition will be held here during the first half of next year is problematical, and in fact few indications are to be encountered that such a show will be staged. Some representatives of the industry believe that a longer period of prosperity is essential before this can be done; on the other hand, it is pointed out that there is still much wealth in the country, that an exposition would give an impetus to sales, and that it perhaps would be an important merchandising factor in building up business to a higher level. Likely the volume of sales during the next few months will determine the show question. It is of further importance that the Havana dealers have not become accustomed to the idea of holding an annual exposition and there is a consequent hesitancy about getting it started.

HAVANA continues to be the chief automotive market and the sales in other sections of the Island are still small. The number of automobiles outside of Havana is large and they are in constant use; nevertheless, it will take at least the new sugar crop to restore these outside localities to any great improvement.

Cuba possesses many good highways and an extensive construction program has been mapped out. This program, of course, was halted by the financial difficulties of 1920. Now that these are disappearing and conditions becoming more stable, it is possible that the road work will be gotten under way again. Cuba undoubtedly has insufficient railroads and the need of more satisfactory ways of communication is apparent. Low transportation costs would materially aid the business revival, but it is probable that street paving in Havana may have to come before the improvement or the construction of rural roads. Many of the Havana streets should have new paving or repairs. Many serious-minded business men here believe that the road problem is one of the most important factors concerning the economic progress of the Island and they believe every effort should be made to promote highway construction. A modern road clear across the island, with branches to the important interior cities, is sorely needed.

WE are indebted to El Automovil Americano correspondence for this excellent survey of the Cuban automotive market.

* * *

The survey shows that sugar is the backbone of the Cuban economic structure and that the automotive business is gaining strength with the steady market recovery of that crop.

* * *

The dealer's needs, the trade practices of the country and the factors which influence the market are all brought out. The American exporter can get valuable ideas from this survey on which to take future action.

Automobiles and automotive products are being sold to-day at prices as low or lower then ever before. The dealers have almost without exception passed on to the buyers all of the numerous factory price reductions. This is fairly well understood by the great body of motorists, who keep in close touch with all automotive matters. It is being realized that the Cuban dollar will buy either as much or more from the automotive dealer than it did before the European War, although quality has generally been improved. This is one of the factors making for increased sales, as lower prices in the automobile word are in keeping with or ahead of the readjustment occasioned by the changing commercial conditions. Motor fuels are being better distributed than in previous years and gasoline prices have been lowered considerably. The advent of an alcohol fuel, which is being used widely in certain makes of cars, has been welcomed throughout the Island and it is being produced in large quantities. Although it is not used in all cars, its use has influenced gasoline distribution, and from this standpoint, if from no other, has justified itself.

The automotive dealers of Cuba have carried a heavy burden for two years and more. That they have been successful in overcoming the many problems confronting them testifies eloquently to the possibilities of future progress.

Motor Car Fleet to Cross Sahara

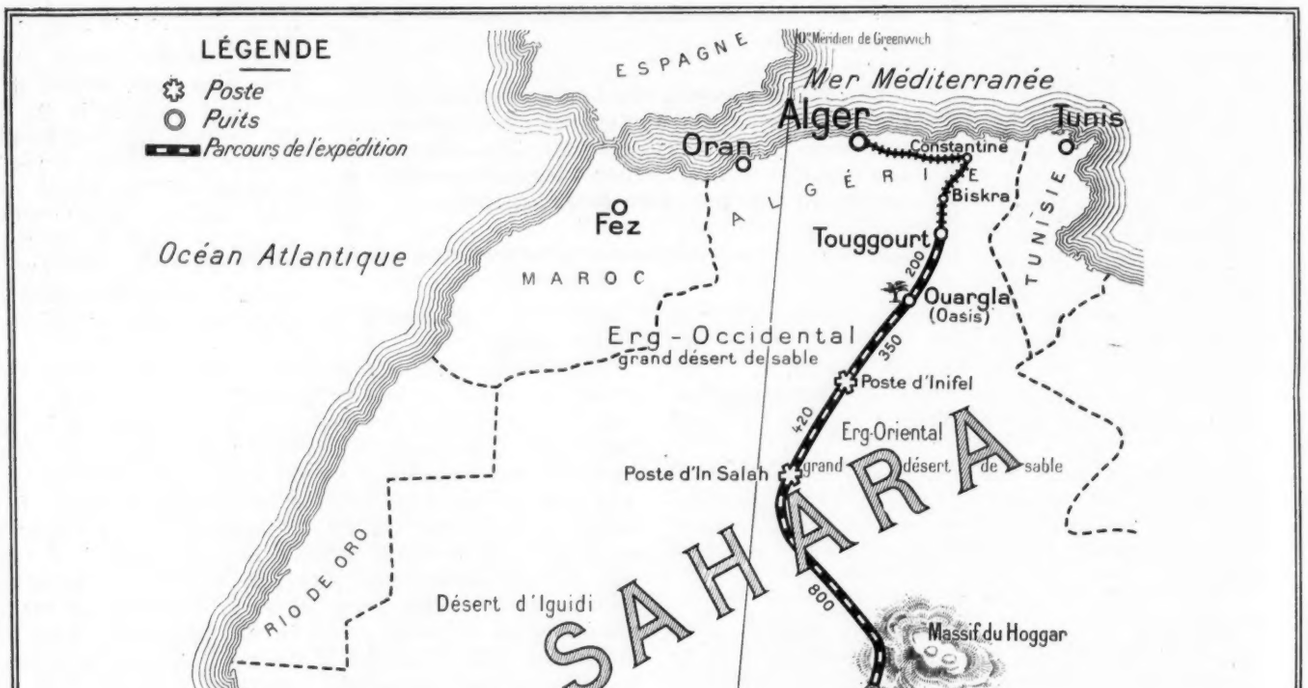
Four Citroens equipped with Kegresse type rubber and canvas creeper bands, begin attempt to traverse desert in two to three weeks. Gasoline consumption expected to be 9 miles per gallon.

AN automobile journey of more than two thousand miles across the Sahara desert, from Algiers to Timbuctoo, thus linking up the French colony of Algiers with possessions on the west coast of Africa, is being attempted by a convoy of four Citroens under the control of G. M. Haardt, managing director of the Citroen Company and Lieut. Audouin-Dubreuil, flying officer and explorer. The expedition is starting as this article goes to press. The French Government, which is interested in the trade possibilities of automobile transportation across the Sahara, is sending Lieut. Estienne, representing the Air Service, and Dr. Castelnau on behalf of the geographical department.

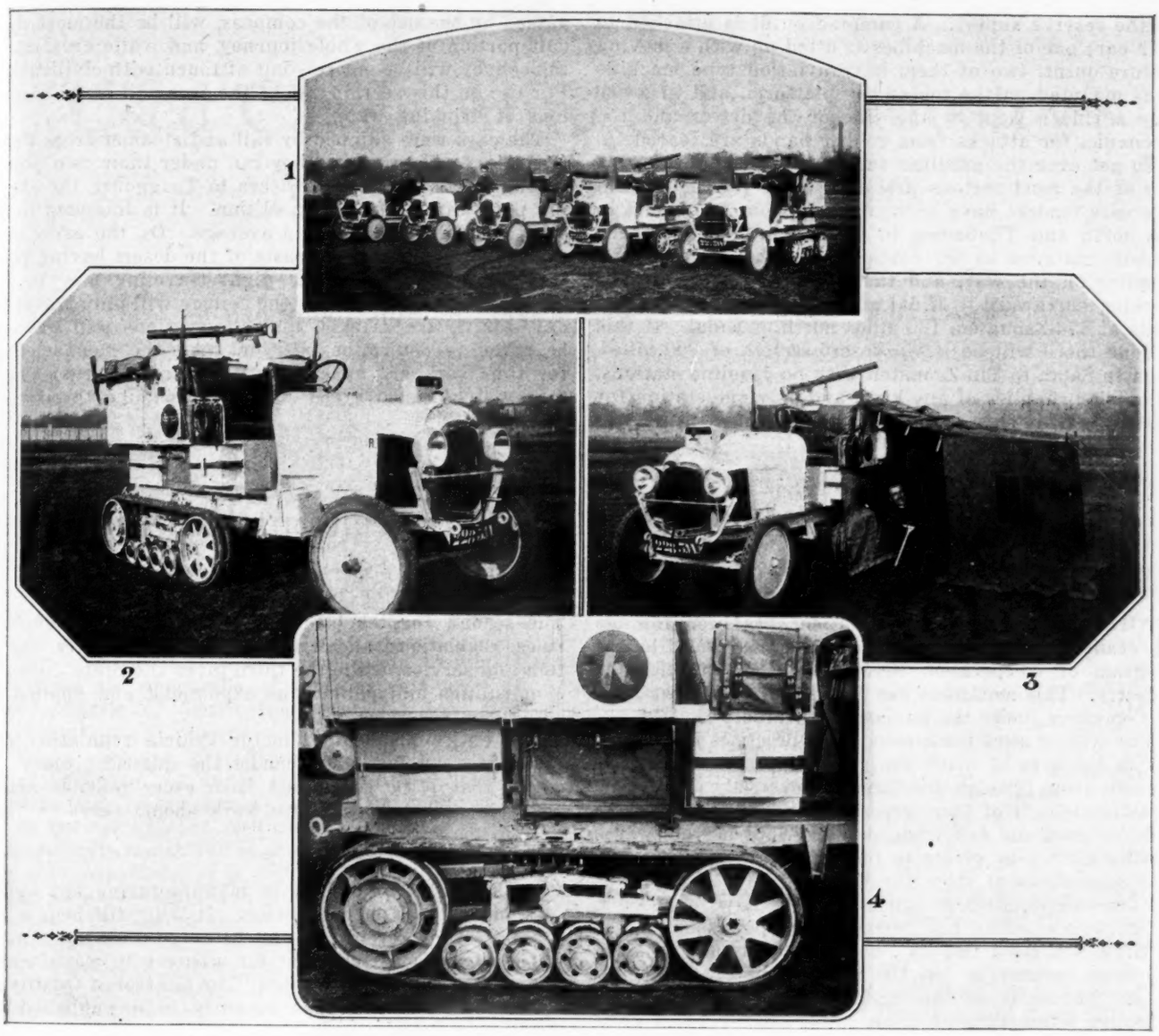
From Touggourt, the most southerly town in Algeria, to Timbuctoo, where there is rail and water connection with the West African Coast, occupies from six to seven months by camel caravans with normal load, although the distance can be covered in two and a half months by caravans with specially selected animals traveling light. Averaging 120 miles a day, the Citroen motor caravan expects to cross the Sahara in from two to three weeks.

This journey is intended to show the possibility of a regular automobile service right across the Sahara desert through territory which at present is closed to all vehicular traffic. To build a railroad across the Sahara will occupy from six to twelve years and will entail enormous sacrifices. By the use of automobiles a wealthy but undeveloped region may be opened up and an overland route will be provided between French possessions on the West Coast and those in Northern Africa. The possibilities of such an automobile route are unlimited.

Four Citroen automobiles with the Kegresse type of



Map of route which motor car fleet will take to cross Sahara Desert



1—The Citroens which are attempting to cross the Sahara Desert. 2—A general view of one of the cars fully equipped for the journey. 3—Camping outfit which constitutes a part of the equipment. 4—Kegresse type of rubber and canvas creeper bands used on cars in convoy

rubber and canvas creeper bands, are being made use of for the Trans-Sahara trip. The power plant is practically identical with that used on the Citroen passenger car and comprises a four-cylinder engine of 68 by 100 mm. bore and stroke, with a plate clutch and three-speed gearset forming a unit with it. Cooling is by thermo-syphon flow, with a bigger capacity radiator than used on the passenger cars, a condenser on the top of the radiator, and a couple of lateral radiators to left and right of the hood, just to the rear of the main radiator. The cooling system is so laid out that if traveling slowly with a following wind the current of air can pass from rear to front instead of from front to rear.

The electric starting equipment has been removed as unnecessary and in order to save weight. The usual electric lighting set is maintained. The engine equipment comprises Solex carbureter and magneto ignition. No important changes have been made in the lubrication system.

Front axle, steering and front wheels are as on the passenger cars, the wheels being fitted with Michelin tires of 710 mm. by 90 mm. size. The banjo type forged rear axle carries two direct drives. Thus, with the three-speed gearbox there are six gear combinations giving a speed range of from 1 to 25 miles an hour at normal engine speeds.

The system of propulsion by endless rubber and canvas bands is the one designed by Kegresse primarily for travel over snow in Russia. Since it was taken up by the Citroen Company, detail changes have been made in this device, one of the most important being the adoption of leaf in place of coil springs for the suspension of the intermediate rollers and the free pulley.

All-metal bodies are fitted, aluminum being very extensively employed, with a use of duralumin in certain cases. The driver sits on the left, with the mechanician on his right, there being a staggered seat between the two for a third person. Back of the seats is a gasoline tank with a capacity of 80 gallons and around this a series of lockers for tools, spares, general equipment and stores. One of the cars carries 175 gallons, this constituting a reserve to be distributed among the others.

In the desert the gas consumption will be at the rate of about nine miles to the American gallon, which will give the normal cars a range of action of about 700 miles, which distance can be extended somewhat by drawing

on the reserve supply. A camping outfit is attached to each car; one of the machines is fitted up with a moving picture outfit, two of them have aviation type machine guns mounted on the top of the platform, and in every case a rifle is kept by the side of the driver and the mechanic, for attacks from robber bands are feared.

To get over the gasoline supply difficulty, which was one of the most serious problems to be faced, Citroen-Kegresse tenders have been sent out from Touggourt in the north and Timbuctoo in the south. The northern convoy has gone as far south as In-Salah, establishing supplies on the way, and the southern convoy is now working northward to Kidal and may possibly reach the wells at Tin-Zaouaten, 120 miles north of Kidal. If this is done there will be left a desert stretch of 800 miles, from In-Salah to Tin-Zaouaten with no gasoline stations, no outside supplies of any kind, and only one station for water at Tit. This section, which will have to be traversed by the use of the compass, will be the most difficult portion of the whole journey, and while crossing it the convoy will be entirely out of touch with civilization. For use on this section one of the cars will carry 15 gallons of drinking water.

The cars were shipped by rail and steamer from Paris to Algiers. From there they ran under their own power through Constantine and Biskra to Touggourt, the starting point of the desert expedition. It is intended to go over 120 miles a day on an average. On the early portion of the journey, over parts of the desert having been thoroughly explored, some night traveling may be indulged in. After In-Salah the convoy will only travel by day, for no tracks exist and observations will have to be taken to determine position. All the men selected for this work are experts with Sahara experience and they will be under strict military discipline throughout the entire trip.

Constructive Function of Trade Associations Receives Greater Attention

THE growth of trade associations has been forcibly called to the attention of the industrial world by the program of co-operation between the government and industry. This movement has been led by the Department of Commerce under the guidance of Herbert Hoover.

The evils of some trade association practices has blotted out in the eyes of many the good which may be and is brought about through this form of industrial co-operation. The Department of Commerce has done valuable work in defining good and evil trade practices, but has done even greater service by giving to the organizations themselves new conceptions of their functions.

"Trade Association Activities and The Law," by Franklin D. Jones, which has recently been published by the McGraw-Hill Book Co., Inc., handles the subject in much the same manner as has the Department of Commerce. In the discussion of the legal and economic aspects of collective action through trade organizations Jones gives the meaning and purpose of the law and illustrates by examples the good which has resulted and may still result in larger measure from such associations.

What may seem harmless practice may in the long run prove detrimental to common welfare and the "twilight zone" may shade rapidly into darkness, hence a book of this nature is valuable to anyone dealing with this subject. It should serve not to guide one through the "twilight zone" but rather to direct toward lawful, beneficial activities.

Herbert Hoover's conception of the trade association's activity may well be repeated here. He has said: "The trade association is a college of business. So long as its activities are such as to fulfill that primary educational function, no question of law will ever bother it. It is when it steps outside of this educational field that it goes into the 'twilight zone'."

* * *

A VERY complete compilation of motor vehicle regulations, legislations and their developments has recently been made by Henry C. Spurr, editor of "Public Utilities Reports." This work is published under the title "Motor Vehicle Transportation" by Public Utilities Reports, Inc., Rochester.

The contents are divided into three chapters. The first deals with the contemporary development of the automobile and the existing theory of public supervision. The second chapter is devoted to a review of general rules, regulations, and legislation governing rates, operation and service, while the third gives the State Commission rulings and policies as expounded and applied in actual controversies.

The entire problem of motor vehicle regulation has come upon us fast. To handle the question sanely requires that it be considered from every possible angle, and this new comprehensive work should serve to view it from the legal side.

* * *

THE control of quality in manufacturing has by no means reached perfection. It will still bear a lot of hard study. With the intention of showing that it is the correct starting point for economy in manufacture George S. Radford has written "The Control of Quality in Manufacture," which has recently been published by the Ronald Press.

In this work Radford shows what the manufacturer must do to secure quality and how to maintain it. Methods in actual operation are outlined and numerous examples given to illustrate the point.

The angle of his approach is well illustrated by the following quotation: "The idea seems to prevail that, because quantity production has been desired, quantity itself is the proper starting point in attacking production problems. * * * As a result quality control has been disregarded and the demand for quantity has been kept in the forefront." Radford goes on to say:

"The misapprehension that quality is costly doubtless arises from the fact that it is used as the chief inducement to make people spend money. In current use moreover, the phrase 'quality production' as distinguished from 'quantity production' does not imply the idea of manufacturing to certain predetermined standards of quality so much as it does that the quality of material and workmanship is of unusually high grade."

Radford says this has given widespread belief that quality is expensive and it is cheaper to make things to a lower standard. This he says is true if working intentionally to a lower grade and definite standard, but usually this implies slipshod manufacture.

It seems to us that this idea that quality and quantity may be found in combination might be played up better in automotive advertising.

Used Car Is Automobile Industry's Most Serious Problem

Sales prosperity has not minimized issue. Prevailing method of handling trades on inflated valuation causes enormous losses. Menace lies in unsound economic practice, not in size of problem.

By Alvan Macauley*
President, Packard Motor Car Co.

THE used car problem is the most serious issue now before the motor car industry. It need hardly be explained that by the "used car problem" I refer to the prevailing methods and practices of handling sales involving trades and of disposing later of the replaced vehicles.

Six or eight months ago, when trade conditions were stagnant and thousands of replaced cars were choking the channels of distribution, everyone was discussing this situation; they were compelled to do so.

When business revived and the distribution of these cars began to get under way we allowed ourselves to believe that the replacement problem was being solved.

In my opinion, *the used car is as much of an issue in the prosperous present as it ever was.* Stated in figures of the current year it is probable that half of this year's sales have been made and are being made on the basis of trades. The percentage of trades may be as low as 40 or it may run as high as 65 per cent. Several persons of wide experience in the industry have assured me that the latter figure is more nearly accurate.

IF the production of new motor vehicles of all kinds this year will approximate a total of 2,400,000, as it is now believed, and since sales are keeping pace with production, it is apparent that the used or replaced car problem is one of huge dimensions.

However, the greatest menace in the situation is not the size of the problem, but the fact that the unsound economic methods which have governed the sale of used vehicles in the past are still the governing factor to-day as heretofore. Used cars are being sold without regard to the overhead cost. Used cars are being accepted on an extravagant basis of valuation.

The overhead cost of selling a used vehicle, according to prevailing experience, is hardly less than the cost of selling a new vehicle. Counting the labor necessary to put the replaced car into a salable condition the average overhead of such sales is certainly not less than 10 per cent. Nevertheless, it is not an exaggeration to say that except in a very small percentage of cases the used or replaced vehicle is sold quite regardless of this.

On the score of valuation most observers agree that the case is as bad. I have heard various estimates from competent persons. On the whole, I believe that the average valuation allowance is about $300 and that the average loss in closing out these vehicles will run not less than 10 per cent. In other words, the prevailing practice is such that there is being incurred in all used car transactions a valuation loss of at least 10 per cent and another loss of 10 per cent more due to the non-accounting of overhead costs. The figures covering the situation are interesting.

Number of new motor vehicles sold in 1922 (partly estimated)	2,400,000
Percentage of sales involving trades	50%
Number of vehicles in trades	1,200,000
Average allowance	$300
Total amount of allowance	$360,000,000
Selling cost of used cars	10%
Total amount of selling cost	$36,000,000
Percentage of loss on trade-in sales in addition to selling cost	10%
Amount of such loss about	$36,000,000
Total loss on trades	$72,000,000

THESE figures will no doubt be questioned. They are not mine, but they have been drawn from competent sources and I believe that on a whole they reflect the situation as it is.

However one may discount them, it is obvious that the present method of handling the used car is still a very serious burden to the motor car industry. For the moment it is being carried with some degree of ease because consumer demand is considerable and profits throughout the industry are satisfactory. It is, nevertheless, a burden. It is more than that. It is a huge item of waste which in some way must be eliminated. Under less favorable conditions than those at present prevailing, it may prove such a handicap to the industry as to check its development and bring serious distress to a considerable number of those who are devoting their energies to its upbuilding.

The conclusions implied in this exhibit are that sales replacement vehicles are being handled without due regard to the actual overhead costs; that these vehicles are being accepted on an extravagant basis of valuation; that there is a loss of many millions of dollars in this phase of distribution—on the basis of the figures cited this loss being upward of seventy million dollars—and finally that this evil condition is the basis of 50 per cent of the sales of new vehicles made in a prosperous year.

IT will, perhaps, be sufficient at this time merely to state the crude facts in the case. Certainly they are startling enough to give any one cause for thought. Something can be said as to the responsibility of this situation —much more as to what can be done to remedy it. But first of all the problem must be seen in its full outlines and recognized for what it is—the most serious issue confronting our industry.

*Reprinted from *Motor World.*

Should Manufacturers Control Dealer Advertising?

Value of local appeal often greater than standardized claims, reiteration and emphasis. Inflexible policies less efficient than those which can be modified to meet local considerations. Competency of dealer should be determining factor in long run.

By Harry Tipper

LETTERS to AUTOMOTIVE INDUSTRIES in the past few weeks have brought to the surface again a controversy which has waged from time to time in the trade and among representatives of the factories. That is the question of the control of dealer's advertising by the manufacturer. The topic itself is sufficiently alive to justify some consideration and the proper examination of it is important to the manufacturer. The objects of advertising through the dealer are:

(1) To secure the advantage of the tie up between the local market and the dealer.

(2) To see that the proper amount and character of advertising is done by the dealer in his locality.

(3) To take advantage of the local circumstances in making the advertising definitely applicable to the user.

How to secure these objects most effectively is the question to be answered in dealing with the problem.

The strong dealer with a knowledge of his own business and a fair control of his trade, is a big business man in point of retail volume in his community, except, perhaps, in the metropolitan centers. Even in those centers he is a big business man in his own conception and understanding of big business.

A retail business which turns over in volume from $250,000 to many millions a year is a big retail business in any field and the man who heads such a concern has his own very definite conceptions of the matter.

The manufacturer who has watched his business grow from a small shop to a great factory and has successfully financed, operated and developed the business, is not likely to take kindly to the idea of anyone else insisting that he do thus and so.

THE dealer who has watched his business grow from a one-man shop to a building which is as good as any in town, and his own standing arrive at an equality with other business men of his community, is not likely to view with any greater pleasure the constant insistence that he must do thus and so, with its inference that his judgment is not to be considered.

It is not easy for any man to be a subordinate and an executive at the same time. The man who gives instructions does not take kindly to receiving instructions in any case. Where the man gives instructions because he owns and has built the business, he is less inclined to view with any kindliness the demand that he must accede to.

This human outlook is of great importance. The manufacturer feels that he has made the dealer possible, while the dealer feels that he provided the working capital for the manufacturer and made his progress real. Of course, the smaller dealer, struggling with the necessities of his development, will accept the demands of the manufacturer until he grows sufficiently strong to kick. His acceptance does not argue an agreement, however, and it will cease to be acceptance when he feels sufficiently powerful to act independently.

Moreover, the manufacturer needs the dealer a good deal more than the individual dealer needs that individual manufacturer. As the business becomes more stable, the competition for good, reliable dealers will become keener—as it has in other fields—and the manufacturer will, of necessity, make his proposition more attractive in one way or another to secure dealers and hold them.

THE dealer must finance, operate and risk his business and the man who does this will escape from the instruction and demand in regard to his operations as fast as he can.

These things do not make it unnecessary for the manufacturer to make specific and definite demands on the dealer, but they do suggest that such demands be made only when the matter is of such importance that its necessity is clear and when the demand can be proved of more efficiency than the suggestion or discussion.

Most of the complaints of the dealer rest on the fact that the demands by the manufacturer have to do mainly with the business which the dealer is conducting at his own risk and which affects his profit. The dealer says he pays 50 per cent of the advertising charge in his locality, but he must agree to let the manufacturer handle the entire advertising.

In view of this controversy, how best can the objects of the advertising be secured?

The objects of the advertising were referred to in the beginning of this article, but it is necessary to consider the fundamentals of advertising for the moment in order to determine how these objects can be secured most effectively.

Advertising has certain definite values which increase its effectiveness in proportion as they enter into the advertising methods and copy. Presenting the name of the product over and over again will make some impression on the buyer because the familiarity with the product secured by this means gives the manufacturer a considerable advantage over the product which is not fa-

miliar. Consequently, the primary value of advertising is secured by virtue of reiteration. Where there is a large amount of advertising reaching the user, attempting to secure his attention for a number of competitive products, it is necessary to add emphasis to the reiteration, in the attempt to secure a larger degree of familiarity with one product than with another. This adds a further value to the advertising as it breeds a stronger impression by virtue of the difference in the emphasis so that some products become more familiar than others.

FAMILIARITY, however, is not sufficient to induce a buying attitude for any particular product on the part of the user, so that the advertising should be used to convey information in order that the consumer will be enabled to determine the value of the product as well as become familiar with its appearance and name. This adds a considerable additional value to the advertising by individualizing the impression, answering the problem to some extent, and bringing it more closely to the consumer's need.

The fourth and most important value of the advertising comes from the application of the product value to the needs of the individual consumer. This means specialized advertising. It has a value which is rarely to be found in advertising copies because so little advertising is specialized, either because the audience is too general or because the advertising writer has been attempting to provide general copy for a number of different specialized publications. The application can only be secured when it is especially applied either to the activities of the consumer or the surroundings. The general advertising done by the manufacturer can provide all the necessary reiteration and emphasis. It can also add some of the information, although this must be more or less indefinite because of the widespread and heterogeneous character of the audience.

The local advertising to be done through the dealer is the only place where the application can be properly determined and unless the advertiser takes advantage of the situation to apply the car to the local conditions and surroundings, one of the most important possible effects of the advertising will be lost. For instance, in my small town in New Jersey, there is a particularly steep hill which the demonstrators use when they desire to indicate the hill-climbing qualities of the car they are trying to sell. Time after time I have heard this hill discussed by motorists as they were explaining the difficulties or qualities of their cars to one another. This particular hill, while it may not be as steep as Pike's Peak or as difficult as many others, is important in the comparative considerations of any motorist in the community.

If I were advertising an automobile to the residents of that town, I should hope to give them specific information as to how the car climbed that hill, its speed at the bottom, its speed at the top, and the conditions at the time. I know that this particular test and information would be read and discussed with at least ten times the emphasis that would pertain to any information not related to that locality. I have yet to see any advertising of automobiles in that town take advantage of this situation to make an impression of lasting quality. The examination of those conditions would reveal a number of other local advertising possibilities far more potent in their effect than the general conversation which appears in the advertising copy used by the dealer. The question as to whether the dealers in that town would write such advertising is another matter.

Of course, it would be manifestly impossible for the manufacturer to send out newspaper copy, direct mail letters and other advertising material which would appeal to all localities. It is therefore impossible for the manufacturer, through his own organization, to secure the great possibilities of this local application in his advertising work. It is true that he can control his advertising, make sure that the claims are standardized, the illustrations the same, and the same emphasis and reiteration is used, but the question which must be determined by the manufacturer is whether, in order to control the minimum possibilities of impression, reiteration and emphasis, he has lessened possibilities of impressions of much more value in the inability to provide thorough information and local application.

It is also evident that it would be difficult for the manufacturer to control the amount of advertising done by the dealer unless the work of the advertising were standardized so that the operations can be conducted with fairly simple requirements. It is also true that the manufacturer is interested in the advertising to be done by the dealer because that advertising will represent to the people in the locality the car itself as well as the dealer. Perhaps the trouble with the situation arises from making a flat policy in regard to the advertising and including this in the contract as a flat policy with no exceptions, calculated to take advantage of the situation where local conditions permit.

THE question of the control of dealer's advertising by the manufacturer is one which has appeared from time to time and has been revived recently through letters to "Automotive Industries."

* * *

Harry Tipper considers, in this article, the fundamentals of advertising and points out how the desired objects can be secured most effectively.

* * *

He maintains that the necessities of competition will oblige the manufacturer to reexamine the question of promotion by the individual dealer and arrange his program to obtain maximum advantage of local appeal.

SOME of the stronger dealers, in fact, a good many of them, do excellent advertising on their own account. It is applied strictly to their local situation and is very valuable on that account. Many of the dealers are not organized so that they can do advertising effectively. This fact, however, does not seem to be any good reason for losing so much of the value of the local application in the advertising where the dealers are sufficiently well equipped to undertake this advertising themselves with the proper co-operation of the factory.

One of the reasons for the strength of store advertising in each locality to the householder, is the strict application of the advertising to the local circumstances.

All standardized policies in marketing are less efficient in their final analysis than policies which can be individually modified to meet the possibilities of local considerations.

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Human Phases of Service

"HUMAN relations between the service station and the owner are of even greater importance than the mechanics of service work at the present time," Clyde Jennings, managing editor of *Motor Age*, told the N. A. C. C. service managers at their convention recently. The statement points out a necessity of present-day service work that has not been adequately recognized in the past.

Good mechanical service is the basis, of course, of satisfaction. But the difference between profit and loss may be determined by how the service is given.

Factories have had traveling service representatives for some years. These men have visited the various distributor and dealer establishments to help out on difficult or constant mechanical troubles. They have directed their attention almost exclusively to the mechanical phases of service and have performed a useful and necessary function. But they are dealing with only half of the service problem. Dealer education is badly needed on the more general aspects of service.

Far more dealers are capable of handling the mechanical problems of service than the merchandising. Few of them really know how to sell service. They do not understand the "human relations between the service station and the owner." Education along this line is necessary.

Design Drops Behind Production

ONE of the great accomplishments of an age of wonders has been the development in this country of an automotive transportation system far superior to that evolved in any other country. American manufacturers have been wonderfully favored in respect to raw materials and fuel supply but more than that has been needed to bring automotive transportation to its present position of importance.

What amounts to a positive genius for mass production has enabled the motor vehicle manufacturer in this country to make convenient and efficient transportation available at a price within the means of a large percentage of American families.

To produce motor vehicles at present low prices in the face of high labor and material costs has been, in itself, no mean achievement. Largely because of intensive cultivation of production facilities, American makers are able to undersell foreign manufacturers in their home markets, although their labor is far cheaper than ours.

So far as comfort, durability, speed and all around efficiency are concerned, remarkable strides have been made in the manufacture of American motor cars in the past decade. Luxurious and commodious bodies have been placed on low-priced cars which will run smoothly up hill and down dale.

But has progress in design and construction kept pace with the improvements in production methods?

Is it not worth while occasionally to stop and try to visualize the advances made in this respect over a period of years?

Consideration of the present-day passenger car as compared with those in general use a decade ago does not reveal as great an advance, except in detail, as is often asserted in casual statements.

We have the same arrangement of units in a car which, so far as the average user is aware, is substantially identical mechanically with that which he owned ten years ago, although its external appearance has changed.

The same throttling type engine, which is decidedly inefficient at the loads or normal service, is still employed, although its compression ratio is lower so that its economy, insofar as it is affected by this factor, is worse rather than better. Fuel handling is improved by the use of better carbureters and manifolds, but this was forced by the decrease in fuel volatility.

Engine lubrication is probably better on the whole, although the all-loss system had certain advantages

not now realized. Fuel dilution of the lubricant, at least, was avoided.

Gearsets and axles have undergone many detail changes but are basically the same in most respects. Spiral bevel-gears are less noisy. In fact the whole car is rather quieter than heretofore.

Frames are generally stiffer but are basically little changed otherwise. Some improved types of wheels are used, but the artillery spoked type is still most extensively employed. Demountable rims have given added convenience, but have in general added weight.

Marked improvement in tire durability stands out as a notable achievement. The cord tire has also improved riding qualities and contributed to better economy. Springing is generally better, due more to the use of longer springs than to any change in type.

The addition of electric starting and lighting equipment was a step in the right direction, but the present electric system leaves much room for improvement in the way of dependability, especially in regard to the battery.

Bodies are, in the main, much improved in appearance as well as in comfort though not always in durability either of the structure or the finish.

There is difference of opinion as to whether the modern car must visit the service station less often than its predecessor. Certainly the service problem is little less acute and there always will be room for improvement on the score of dependability.

Thanks largely to lighter reciprocating parts, better mixture preparation and lower gear ratios, the modern car handles or "gets away" better than did most earlier cars, but a part of this gain is often at the expense of good fuel economy.

It must be admitted that the chief advances which the industry has made are in respect to production. There is still much room for improved design and construction.

Having achieved the goal of low production costs is it not time the industry turned its attention to bettering quality without rise in price rather than to further decreasing price?

Standardize Gearshifts

THE shifting of gears becomes second nature to the car driver and he does not have to stop to think what position he should throw the gearshift lever to produce the necessary result. Very fortunately in the early days of automobile history, makers imitated one another in the matter of general control so that all cars now have the foot brake to the right and the clutch to the left. Steering wheels also all turn the same way and a hand lever is used for the emergency brake. This makes it easy for a man who can drive one make of car to drive another make. But the matter of gearshifting has not been standardized, with the result that the driver who is used to one make of car finds difficulty in changing gears on other cars. The Society of Automotive Engineers, in 1916, adopted a recommended standard in which the low gear is back left, intermediate, front right, high, back right and reverse, left front. While many makers have adopted that form of control, there are enough makers who are using other forms of shifts to seriously interfere with the standardization program.

From the sales standpoint, the lack of standardization is serious. The man who has owned a car, say with a standard gearshift, likes to try driving a new car being demonstrated to him and if this car shifts gears differently he finds a great deal of difficulty in shifting gears, has to center his attention on gears and has little opportunity to observe the other fine points of the car. Dealers and salesmen have been known to lose many sales because they had difficulty themselves in shifting gears on used cars they were demonstrating and there is quite a string of accidents to the credit of the unstandardized gearshift.

There are no design or construction difficulties in the way of making any gearshift standard and a great benefit would be conferred on dealers and owners.

Helping Dealers to Sell

MANUFACTURERS in all branches of the industry are profoundly interested in plans for the education of their dealers and for increasing the sale of their products. Ray W. Sherman, merchandising director of the Automotive Equipment Association, makes a suggestion in a recent issue of *The Sales Executive* which can be adopted with profit by the makers of many parts and accessories.

"There is one thing," he says, "every dealer wants to know about the product of every manufacturer: How to make money with it.

"Unless the dealer can know this one thing about the product, he doesn't care anything about all the rest that might be said about it.

"If there is one man in all the world who should know how the dealer can make money with the product, it is the man who makes the product. He designed it. He has lived with it, dreamed about it, studied it and is the source of all information about it.

"If the maker of every product could tell the dealer in a piece of printed matter specifically how the dealer could make money with it, the dealer should be interested in the story and should appreciate this help from the manufacturer. Literature of this kind could be mailed direct, used as a return key in advertising and distributed through jobbers and their salesmen or the manufacturer's own men.

"Such a piece of literature doesn't need to be expensive or elaborate. It doesn't need to be filled with thousands of 85-cent words. It needs plain Anglo-Saxon, stripped of all the glorious pictures of factories and reasons why you think the product is good and told from the standpoint of the dealer.

"If each manufacturer would get out one such piece of literature and arrange for its distribution, it would aid greatly in the work of business education. The man who got the idea to the dealer would profit because the dealer would sell that product."

November Output Reaches 232,000

Total So Far in 1922 Placed at 2,346,120

Industry Seems Assured of Reaching 2,500,000 Production Figure This Year

NEW YORK, Dec. 13 — Eleven months' production of motor vehicles in 1922 is greater by 140,923 than the entire previous best year on record—1920, when 2,205,197 cars and trucks were built. With another month to go it appears that the estimated production for the year, 2,500,000, will be easy of accomplishment.

November, a short month inclusive of a holiday, proved to be another record breaker, according to shipping returns received by the National Automobile Chamber of Commerce, figures showing an output of 232,000 vehicles. Total output for the 11 months is 2,346,120.

This made the eighth consecutive month to pass 200,000 and indications are that December will be included in this group. Despite the fact some factories are taking inventory this month, it is hardly likely that the December figures will be below 200,000. Granted that they will not be, it looks as if the annual production will be in the neighborhood of 2,550,000.

That the railroad situation is not getting any worse and possibly is improving is indicated by the N. A. C. C. reports. Compared with October, carload shipments in November were greater, while driveaways and boat shipments have fallen off. Unless big storms tie up the railroads, it is thought that shipping conditions will improve from now on.

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Moline Plants Working at 75 Per Cent Normal

EAST MOLINE, ILL., Dec. 11—The R. & V. Motor Co. within two weeks will be operating on full schedule and indications are that after the plant gets under way on this schedule further additions to the force will be made.

A general survey in the manufacturing field in this community shows an average working basis 75 per cent normal with promise that there will be no let-up in activities during the winter. Implement factories are operating on a scale about 60 per cent normal.

The American Motor Parts Co. and Aluminum Manufacturing Co., both relatively small concerns, are anticipating no reduction from present production and the Troy Laundry Machinery Co., recently located in the R. & V. Motor Co. buildings group has orders sufficient to justify operation with its present force through until June.

About 2200 men are employed in the manufacturing industries here.

Business in Brief

NEW YORK, Dec. 14—Retail buying has been stimulated by the first touch of real winter. Footwear, heavy apparel and holiday buying lead. Primary lines show a general seasonal slowing down. Collections are fair.

The car supply is better. This is particularly true through the grain centers. Traffic is the heaviest at this time on western roads for several years. Car shops are working at capacity and equipment is rapidly being placed in better condition.

Car loadings for the week ending Nov. 25 totalled 955,495, a reduction of 13,599 from the previous week. This was far in excess of the same period for 1920 and 1921.

November pig iron output was the largest in two years. Good buying of that product resulted from a steady ten weeks' price decline. Steel remained fairly steady. Railroads continue to buy cars, locomotives and tools, and makers have a year's business ahead. Coke prices eased.

Coal output increased with a quickening in the demand for soft coal. Anthracite output was at a peak, and a large shortage still exists. Domestic consumers have been advised to utilize steam sizes to avoid later hardship.

Estimate of winter wheat acreage shows a cut of 10 per cent over last year. Grain movement from interior to primary markets is large. Farmers, on the whole, are not free sellers of corn.

Stocks showed irregular movement during the week. Bonds likewise were irregular and active. Liberties showed an increasing firmness.

Sterling set a new high record for the year, rising to 4.57⅛ for demand. Bank clearings increased 46.4 per cent over the holiday week of Nov. 30, aggregating $8,035,407,000. Business failures increased over the previous week and numbered 462.

Industry Preparing for Output in 1923

Inventory Taking Will Cause Break in Plant Operations During December

NEW YORK, Dec. 11—The automotive industry, with a record back of it this year unsurpassed in its production history, is beginning to prepare for an even greater output in 1923. Factory operations are taking on a more conservative tone as the month advances toward the annual inventory period, during the holiday season, with the result that December will fall somewhat short of the average maintained during the previous months of the year.

This is an expected situation and does not indicate that there has been any pronounced lull in the demand for cars. The surprising feature of the last few months is that the volume of sales in a naturally dull season enabled manufacturers to operate on schedules that brought the total output for 11 months to exceed that for all of 1920.

Body Shortage Still Drawback

Production is taking care of current demands as well as the many back orders that have been held up because of the lack of closed bodies. The shortage of bodies is still a great drawback to prompt deliveries. Shipments of finished cars are going forward as fast as rail facilities can handle them.

With December on a satisfactory basis, even in comparison with the best months of the year, brisk activity will be resumed after the first of the year when New York ushers in the show season and such plants as now are operating on curtailed programs return to quantity production. The end of the inventory period will find factories in a condition to enter the production year with greater facilities to take care of the anticipated demand.

The New York show will present for the first time a number of new models, as indicated by the showing of the higher priced lines at the New York salon last week. Keen interest already evidenced doubtless will set a

(*Continued on page* 1203)

Reorganized Dunlop to Open Plant

Operations to Start at Buffalo by March

Edward B. Germain Heads American Company—New Financing Accomplished

NEW YORK, Dec. 11—Reorganization of the Dunlop Tire & Rubber Corp. of America has been completed, following a month's meeting in this city of the directors of the English company. The $20,000,000 plant at Buffalo will be put in operation not later than March 1. At the start the plant will produce about 20 per cent of its daily capacity of 12,500 tires, which also will include solids. Ninety per cent of the machinery already has been installed.

The personnel of the American organization will be new throughout, with Sir Eric Geddes, brother of the British Ambassador at Washington, as chairman of the board, and Edward B. Germain as president and general manager. Germain sailed for England Saturday with Sir Eric for a meeting with the English company's directors in London, and no further announcements of the personnel will be made until his return the latter part of the month.

Walcott Serves on Committee

Frederic C. Walcott, originally president of the American company and liaison officer between the English and American interests, while the Buffalo plant has been idle, will be one of three to serve on the executive committee. He also will continue to act as president of the Utica Spinning Co. at Utica, N. Y., which is a Dunlop subsidiary and which will manufacture the cord fabric for the Buffalo plant.

On the American board of directors serving under Sir Eric are Frederick W. Allen of Lee, Higginson & Co., representing the banking interests; Pierre du Pont, J. J. Storrow, Sir George Beharrell, Robert K. Pomeroy, Louis Bergen and Charles A. Proctor. Directors of the English company are Frederic C. Walcott and J. Westren. Sir Eric is chairman of both the English and American boards.

Germain is an organizer rather than a tire man. He comes from the Bethlehem Shipbuilding Corp., with which he was identified for seven years, latterly in charge of the Moore plant at Elizabeth, N. J. He is given credit, as a Bethlehem executive, for directing the construction of Hog Island during the war. As general manager, he succeeds P. D. Saylor, formerly with Goodyear in England, who now is president of the Batavia Rubber Co.

The refinancing of the American enterprise was accomplished through the issue of $15,886,000 first mortgage 7 per cent bonds to a syndicate of New York bankers, the entire issue having been already oversubscribed. This syndicate is headed by Lee, Higginson & Co. and Brown Bros. & Co., who are offering a new issue of 7 per cent first, closed mortgage and collateral trust sinking fund convertible gold bonds of the Dunlop Tire & Rubber Corp. of America at a price of 95 and accrued interest to yield more than 7.60 per cent. The American series (A) amounts to $11,000,000, and the British series (B) to £1,000,000, both equivalent at par of exchange to $15,866,700.

The bonds are dated Dec. 1, 1922, and due Dec. 1, 1942. They are convertible after Dec. 1, 1924, into 8 per cent cumulative preferred stock and common stock of the Dunlop Tire & Rubber Corp. of America at the rate of $1,000 par value of preferred stock and two shares of no par value common stock for each $1,000 of bonds. A sinking fund, payable semi-annually, first payment Oct. 15, 1924, must call and retire the issue at 105, and is sufficient to retire the bonds at or

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There Will Always Be a Place in the Automotive Industry for Smaller Producing Companies

By J. I. HANDLEY,
President of Handley Motors, Inc.

Detroit, December 11.

Automobile manufacturing will probably reach its highest peak in 1923, exceeding the high totals established in this year by many thousands, but following this there will probably be a tapering off, with the business holding about even thereafter and with gains or losses according to the general business condition of the country.

In 1923 the industry will catch up with the market which has been undersold since the depression of 1920. Manufacturers will have an opportunity in 1923 to establish their companies firmly, and should make provision for a falling off in business after the market has been caught up. It is impossible that the industry can continue to make million gains each year, but it will make steady progress always.

The time will never come when the industry will be controlled by half a dozen large producing companies. There will always be a place for the smaller manufacturer who conducts his business sanely and conservatively and who knows his market. Many of the smaller companies are among the leading money makers, dividing profits rather than devoting it to expansion keeping them relatively small.

Smaller production companies will have their best success in appealing to the individualistic car buyer. They cannot be expected to compete with the large producers on a price basis but they can get the business of the buyer who likes specially appointed cars. By building individuality into their cars, and by keeping their prices as low as possible by the utmost care in the management of their factories, they will find themselves always in position to do a satisfactory business.

The dealer situation to-day is the difficult problem for the smaller manufacturer. Hundreds of dealers are out of business because the depression caught them without sufficient capital. New dealers must be built up and if necessary smaller manufacturers with non-competitive lines should join in developing new dealers. There is too much competition among small manufacturers for available dealers now.

There is a growing tendency on the part of dealers to break away from the requirement of representing one car exclusively, this being especially marked among dealers of factories which make only one type of car. This situation is mainly a question of the strength of the dealer and of the factory. If the dealer is the stronger he can usually represent as many cars as he desires. Small producing companies will benefit by the opportunity to share sales outlets with other companies.

Everything is set for a great year for the industry in the coming year. General business of the company will be good and when general business is good the automobile business is unusually good. It is true that there are conditions in the United States and abroad which set up a disturbing mental influence of insecurity but this feeling is gradually being broken down and should disappear in the improved conditions of the new year.

Gordon Lee Leaves Government Service

Goes With Yellow Cab Manufacturing Co. as Foreign Sales Director

CHICAGO, Dec. 11—Gordon Lee has resigned as chief of the automotive division of the Bureau of Foreign and Domestic Commerce to become foreign sales director of the Yellow Cab Manufacturing Co. of this city. His resignation takes effect Dec. 15.

Lee has been head of the division since its inception under the Hoover regime two years ago. Installed simultaneously with some ten or twelve other commodity divisions, the automotive division has grown constantly in efficiency and scope under Lee's administration. It is now one of the most active and important of the commodity divisions.

Lee is making a return to active work in the automotive industry through his new connection. Before becoming chief of the automotive division, he traveled extensively in foreign countries as a representative of Gaston, Williams & Wigmore. His active merchandising work in the domestic field includes several years work with Thomas J. Northway in the State of New York, where he gained considerable reputation as a missionary for the Fordson tractor.

He is the third important executive from the industry to go to the John Hertz interests during recent months, J. A. Ritchie and George A. Green having been brought to Chicago from the Fifth Avenue Coach Co. of New York some weeks ago as executives in the corporation which will build and operate taxicabs and motor buses on an extensive scale.

M. H. Hoepli will be acting chief of the division.

Enjoins General Motors in Deppe Patent Action

WILMINGTON, DEL., Dec. 9—The United States District Court has issued a temporary injunction restraining the General Motors Corp. from manufacturing devices alleged to infringe on certain patented super-internal combustion engines and super-heater manifolds held by the Deppe Motor Corp. of New York.

The Deppe corporation owns United States patent No. 1,335,665, issued March 30, 1920, entitled "Internal Combustion Engine." The patent relates chiefly to a method of preparing the combustible mixture, and one of its claims reads as follows:

The method of preparing an explosive mixture for combustion in heat and power units which consists in charging a moving column of highly heated air with liquid fuel spray then contracting the column and increasing the rate of flow of the mixture, then churning the mixture while applying heat to further atomize the fuel particles, then kneading the mixture by alternately sheeting or flattening the column and restoring it to cylindrical form, heat being applied on both sides of the sheet at each sheeting stage at progressively increasing temperatures, whereby the mixture is converted into a homogeneous dry gas adapted to remain as such during and after delivery to the heat or power unit.

The concern also owns United States patent No. 1,360,098, issued Nov. 23, 1920, and entitled "Super-Heater Manifold for Internal Combustion Engine." This manifold comprises a conduit of alternate round and thinly flattened portions and jackets and pipe connections, whereby the exhaust gases are utilized for heating the flattened portions uniformly on both sides, the flattened portions and jackets and pipe connections being so connected and proportioned that the heating temperatures at succeeding flattened portions are progressively higher toward the intake of the engine.

SURVEY SHOWS LOSS IN USED CAR VALUES

ST. LOUIS, Dec. 11—The National Automobile Dealers Association is now making a survey of the used car situation in Pennsylvania.

Of 3100 dealers addressed, complete replies have been received from 252, who reported 2445 used cars on hand Dec. 1, which were acquired at a cost of $1,014,322. The present actual market value of these cars, the dealers estimate, to be $844,648, or a flat loss of $169,674. It is figured that by the time there are added to this figure the cost of conditioning the cars for resale, the selling cost and the legitimate items of overhead expense, another $160,000 loss will be suffered.

Forty-two dealers reported the actual value of the cars the same as the acquisition cost, 45 reported the acquisition cost lower than the present actual market value, but 165 dealers reported the acquisition cost higher than the present actual market value.

MAY DISCONTINUE JACKSON

DAYTON, OHIO, Dec. 9—The Jackson car, formerly manufactured in Jackson, Mich., will be discontinued, according to the plans of Associated Motor Industries. It is planned to replace the Jackson line with a smaller National. It has not been determined whether the small National will be made in Jackson, or whether the factory there will be used as a body plant. It is expected that both National models will be exhibited at the New York show.

TO DISCUSS BODY FUTURE

DETROIT, Dec. 9—The Detroit section of the Society of Automotive Engineers has selected as the subject for discussion at its meeting Dec. 21 "The Future in Closed Bodies."

War Risk Insurance Return Is Possible

George F. Bauer of N. A. C. C. Sees Chance of Recovery Under German Treaty

NEW YORK, Dec. 11—That millions of dollars paid out by American automobile manufacturers as war risk insurance from 1914 to 1918, inclusive, may be recovered from the German Government is stated by George F. Bauer, head of the foreign relations department of the National Automobile Chamber of Commerce.

During the war period 265,180 motor vehicles, of which 213,164 were passenger cars and 52,016 were motor trucks, were exported and on each of them war risk insurance had to be paid by American automobile manufacturers.

Reimbursement now is possible because of the treaty between Germany and the United States setting up a mixed claims commission, provided the foreign clients were American citizens. Also, because of this treaty, reimbursements may be had on debts owing American citizens by the German Government, or by German nationals.

Letter to N. A. C. C. Members

In a letter to N. A. C. C. members Bauer advises:

In initial steps, at least, the assistance of an attorney is not needed, as claims may be presented to the Department of State and are transmitted to Robert Morris, head of the commission, which maintains offices at 911 Fifteenth Street, Washington, D. C. A petition in typewritten letter form should be presented in duplicate to the Department of State, and contain a full, complete statement of nationality of firm, amounts paid on war risk insurance policies, and that the claim is being made under the terms of the Germany-United States treaty.

The petition, signed by two officers of the company, must be sworn to under oath. Evidence in support of claim is not required in the beginning, although a request may subsequently be made by the mixed claim commission. To be acted upon, the petition must be presented not later than Jan. 1, 1923.

Ver Linden Plans Return With Light Assembled Six

DETROIT, Dec. 12—Edward Ver Linden, former president of Olds Motor Works and for a time president of the Durant Motor Co. of Michigan, is prepared to re-enter the manufacturing field with a light six assembled car which will be priced below $1,000. The car has been fully developed and production on it will be started soon after the first of the year if Ver Linden is successful in buying out the business of a company now established.

In his plans Ver Linden is known to have important financial connections. It is his intention to buy out a going company rather than undertake to build up an entirely new dealer organization.

To Distribute Bodies from Zone Factories

Springfield Body Corp. Formed—Has Bought One Plant as Part of Its Plans

NEW YORK, Dec. 13—The Springfield Body Corp. has been formed to include three or four large body building plants which will build custom bodies on an extensive scale for manufacturers and dealers. It is estimated that the group will have a capacity of 15,000 bodies annually. The corporation has issued 100,000 shares of capital stock, which, it is said, have been sold. Details as to capitalization, officers, etc., will not be available until after a meeting of the promoters on Dec. 22.

The first plant to be taken over is that of the Smith Springfield Body Corp. of Springfield, Mass., which has property valued at $750,000 and quick assets of $200,000. Its capacity is 1000 bodies a year, it is said. Prominent in the formation of the new concern are two of the Smith Springfield officials, President C. S. Dame and General Sales Manager A. H. Wolf.

May Buy Three More Plants

According to present plans, the corporation will purchase at least two and possibly three more plants. One of these, located in the New York district, will have a yearly output of 2500 custom bodies, and will supply the New York and Philadelphia districts as well as meet export requirements, while Springfield will care for New England. Another factory, probably one in the Detroit district, will serve the midwest. A plant in the Indianapolis section also is under consideration.

Under this arrangement it is figured that there will be a considerable saving in freight car space and shipping costs to the automobile manufacturer as a result of such distribution of custom body factories, all operating under one head and producing similar jobs. Car makers can ship chassis to the distributing centers and the bodies will be mounted there or at the body plants. It is also pointed out that there will be a considerable saving due to centralized designing, buying, selling and financing, which will tend to spread the vogue of custom-built bodies.

No Successor Appointed to Col. Smith of Republic

DETROIT, Dec. 12—No action will be taken by the directors of the Republic Motor Truck Co. on the election of a new president to succeed Col. Frank E. Smith, resigned, pending developments of the receivership under which the company is now operating. Only one or two of the former officers are being retained by the receiver, the work of administering the property having reached a point where the retention of the others was no longer required.

In connection with the present status of the company, the receiver said that appraisals have been completed and that other administrative work has reached a point where the property can be managed with only a small organization. It is expected that the property will be either closed out or sold at receiver's sale in less than two months.

Colonel Smith's resignation is considered as indicating that he has definitely given up hope of reorganizing the company on the basis that he had planned.

ANTI-CAR ADS SHOW RIGORS OF WINTER

NEW YORK, Dec. 11—Advertising propaganda tending to discourage the use of the automobile in winter is being broadcast by the American Electric Railway Association, with which most of the trolley lines of the country are affiliated.

This association has prepared a series of advertisements for use in daily papers which has been sent to its members, with advice that these advertisements be used.

In each of the dozen samples submitted great stress is laid pictorially on the rigors of winter motoring, including the troubles of starting, cold garages, cold hands and feet, etc., while on the other hand the comfort to be enjoyed in trolley riding is emphasized, not overlooking the money claimed to be saved by using trolleys instead of automobiles.

Cadillac Not to Close for Inventory Taking

DETROIT, Dec. 9—Because of the large increase in business following its recent price cut, the Cadillac Motor Car Co. will not close for inventory two weeks the first of the year as planned. Instead, H. H. Rice, president, said, the company will continue at full force and will take on additional workmen.

Cadillac's production schedule for December will be one of the two greatest December schedules in its history, according to Rice. January and February also will be big months in Cadillac production.

R. E. OLDS SELLS FLORIDA LAND

LANSING, Dec. 11—R. E. Olds, president of the Reo Motor Car Co., has sold his holdings at Oldsmar, Fla., to the Cornwell Real Estate Co., in exchange for a hotel property in Kansas City. Olds said he had disposed of his Florida property that he might be relieved of the necessity of giving it personal attention, which its development necessitated.

Mengel Body Starts $350,000 Plant Unit

Will Be Ready for Occupancy June 1st—Company Building for Durant Now

LOUISVILLE, KY., Dec. 12—Ground has been broken for the first factory unit of the Mengel Body Co.'s plant here. Contract for its erection has been awarded, the bid for the structural work being approximately $220,000. Machinery and equipment are expected to make the total cost about $350,000.

In association with the Mengel Co., lumber and box concern, of which it is a subsidiary, the body manufacturing company has a $20,000,000 five-year contract to supply bodies for Durant products. Construction of these bodies already has been undertaken on a gradually increasing scale in the plant of the parent company here.

The first unit of the new plant will be ready for occupancy by June 1, according to plans. Actual construction will be nearly completed about April 1, when the installation of machinery will begin.

One of Most Modern in South

This building will be one of the most modern factories in the South. It will be one-story and will have a ground area of 276 x 441 feet. The construction will be reinforced concrete, brick and steel. There will be a basement under a portion of the building. Ample light and ventilation will be provided throughout.

The plant will have switching connections with the Louisville & Nashville and the Southern Railway. It will consist of dry kilns and assembling, painting and finishing departments. When completed it will occupy an area of 200,000 sq. ft. and will be so constructed that additional units can be added. Other units will be erected as rapidly as plans are completed.

Present plans of the company call for the manufacture of 30,000 bodies the first year, giving employment to 500 men. These bodies will be for light trucks, park and station wagons and regular chassis, particularly for delivery purposes.

Insurance Rates Lowered by Campaign of N. A. D. A.

ST. LOUIS, Dec. 11—After six months of the competition to which casualty insurance companies of the United States have been subjected by the Insurance Service Department of the National Automobile Dealers' Association, the insurance companies have revised the "Manual" rates applying to automobile dealers and garages to a point virtually 20 per cent lower than the existing rates at the time the N. A. D. A. began its struggle for lower rates for the industry.

The rates are still 25 to 30 per cent higher than those available for members of the National Association through their organization.

Nash Perfects Plan for Stock Dividend

Shareholders Will Receive New Common and Preferred for Old Common

KENOSHA, Dec. 11—Plans for greatly enlarged financing of the Nash Motors Co. by a stock dividend which would give four shares of new common stock and three shares of new 7 per cent preferred to stockholders for each share of common now held have been announced by Charles W. Nash, president of the company.

The plans are to be submitted to the stockholders for approval at Baltimore, next Saturday.

The stock now outstanding is 54,600 shares of common and $3,500,000 of preferred. The outstanding preferred stock is to be retired on Feb. 1, 1923, at $110 a share plus accrued quarterly dividends and the plans provide for a new issue of $22,500,000 preferred stock.

The common stock would be increased to 300,000 shares of no par value providing for the distribution of 218,400 shares as a stock dividend. The preferred also would be issued as a stock dividend.

Paige-Detroit Will Pay Common Stock Dividend

DETROIT, Dec. 11—Declaration of a common stock dividend of 100 per cent by the Paige-Detroit Motor Car Co. will bring its total capitalization to approximately $6,800,000, made up of $4,000,000 common and $2,800,000 preferred, all of which is outstanding.

The stock dividend is payable on Dec. 29, and a cash dividend of 3 per cent will be paid on common stock Jan. 2. The regular quarterly preferred dividend also is payable at that time.

Ford Will Declare Only Regular Cash Dividends

BOSTON, Dec. 11—Henry Ford asserts the Ford Motor Co. will not declare a stock dividend this year. He added, however, that he believed the present wave of stock dividend declarations by corporations a business necessity.

"We are expanding steadily," said Ford. "We have a $30,000,000 program for improvements to be completed within a year. We won't declare any stock dividend, only the regular cash dividends, and we will spend our funds in the same way we have in the past, that is, in extensions and improvements."

OLDS WANTS BETTER WINDOWS

DETROIT, Dec. 11—Olds Motor Works has offered cash prizes of $50, $30 and $20 for the three best window displays by its dealers and distributors. The contest will close on Jan. 15, when a committee selected by the factory will pass upon photographs of all windows entered.

Window displays have not been attractive enough in the past, and the contest is intended to bring about an improvement. Christmas displays in several localities last year produced such marked results upon sales that the company is seeking to nationalize the effort for better windows.

N. A. C. C. AT DINNER TO HEAR WILL ROGERS

NEW YORK, Dec. 11—Will Rogers is going into the automobile business, for one night.

He will be one of the two speakers at the annual dinner of the National Automobile Chamber of Commerce, to be held in the Hotel Commodore, this city, Jan. 9.

The subject of his talk will be "What I Think About Automobiles."

Columbia Motor Declares Financial Condition Good

DETROIT, Dec. 11—Distributors of the Columbia Motor Car Co. this week signed contracts for all cars produced in the first six months of operation in 1923, a total approximating 13,000. According to W. L. Daley, vice-president in charge of sales, 40 per cent of production in the first three months and 35 per cent in the second quarter will be closed models.

The company declares itself to be in strong financial condition at the closing of the year and, with a greatly increased sales and distributing organization, will be in position to realize strongly on the potential business of the new year.

In strengthening its sales group, the company states that it is now adequately represented in every important center. Distributors say that fall sales in both the light six and Elite models were heavy.

Morse Chain Completes New Factory in Detroit

DETROIT, Dec. 11—Morse Chain Co. has completed its new factory here, in which it will manufacture all sprockets and adjustments used in Morse front end drives and the new Morse silent chain bus transmission. The building provides a total manufacturing space of 60,000 sq. ft., in addition to quarters for the sales and engineering departments.

With its new production facilities the company declares it will be able to handle the present volume of business more expeditiously and is in position to expand the output under pressure of unusual sales conditions.

The present building will be the center one of four when the company's plans for expansion are realized.

May Sell Standard Parts February 20

Stockholders Likely to Organize to Make Purchase—Creditors Hurry Action

CLEVELAND, Dec. 11—Stockholders of the Standard Parts Co. may organize to buy the plants of the company at a sale which will probably be held on Feb. 20. Receiver F. A. Scott has made application to sell and the court will pass on the request on Jan. 6.

Receiver Scott suggests that the Eaton Axle Co. plant, Standard Welding Co. and the Perfection Spring Co. plants be sold as units. He also explains it may be well to sell the Perfection spring plant, the Pontiac spring plant and the Cleveland, New York and Boston service stations.

Creditors met with the receiver recently to consider plans for expediting the payment of claims. Following this meeting, it was stated that Scott would be asked to file with the United States District Court an application to sell the plants at public or private sale.

Under Receivership Since 1920

Standard Parts has been operating under a receiver appointed by the United States District Court of this city since September, 1920, and because of this unusual length of time the creditors want closing up of their claims expedited.

The company at present is operating five plants, but only four are under the direction of the receiver. The fifth, the Bock Bearing Co. of Toledo, is controlled through stock-ownership. The four that are under the direction of the receiver are the Standard Welding Co., the Perfection Spring Co., the Eaton Axle Co. and a spring plant at Pontiac, Mich.

The American Ball Bearing Co., an axle plant in Cincinnati and a spring plant in Canton were never placed in operation by the receiver, but were sold, the Cincinnati plant bringing $59,000 and the Canton plant $203,000.

When the Standard Parts went into the hands of a receiver, the creditors' claims amounted to $11,000,000. Since then they have been reduced to $7,000,000. The interest on the entire amount $1,000,000, has been paid.

Inventory Being Taken at H. J. Walker Factory

CLEVELAND, Dec. 9—Inventory is being taken at the plant of the H. J. Walker Co. manufacturer of automobile engines which is now in the hands of a receiver, Joseph C. Hostetler, who was appointed by United States District Judge Westenhaver.

The White Head Sales Co., the Stevens Davis Co. and Fairbanks Morse Co. are the creditors of the company which applied for the receiver.

N. A. C. C. Asks Views on Value of Shows

Competition, Open to Motorists and Members of Industry, Closes Jan. 3

NEW YORK, Dec. 11—Desiring to feel out the public pulse as to the value of national shows and also to sound the automotive industry along the same lines, the show committee of the National Automobile Chamber of Commerce announces a competition open not only to motorists but also to members of the industry. The questions asked are:

"In what way are the national automobile shows of value to the public?"

"In what way are the national automobile shows of value to my company?"

"In what way are the national automobile shows of value to me?"

The conditions governing the competition are as follows:

(1) Any competitor may answer one or all questions separately or may combine the answers in one article, but no one will be awarded two prizes. Articles must not exceed 1500 words if all three questions are answered; they must not exceed 1000 words if two questions are answered or 5000 if only one question is answered.

(2) The construction or phraseology of the answer will not be a factor in the awards—reasons will be the dominant points upon which awards will be based.

(3) No one connected with the offices of the National Automobile Chamber of Commerce or the show management may compete.

(4) Answers must be received not later than midnight, Wednesday, Jan. 3, 1923. They must be sent to S. A. Miles, manager of the National Automobile Shows, 366 Madison avenue, New York and will be judged by a committee appointed by the president of the N. A. C. C.

The answer adjudged best of all will win a $200 watch, and the contestants whose answers are considered second and third best will each receive a $150 watch.

Would Change London Dates

LONDON, Dec. 5 (*by mail*)—A petition has been presented by several British firms to the Council of the Society of Motor Manufacturers and Traders—the organizers of the annual London show—asking that the show be suspended until 1924, in order to test a theory that the elimination of the annual exhibition November would cut out or at least reduce the extent and severity of the dead car-buying season in the autumn.

As an alternative, it is suggested that the show be held between Aug. 15 and Sept. 15, the contention being that, if the show were held then, orders would be given for immediate delivery which would otherwise be held up until November.

GASOLINE EXPORTS DECLINED

WASHINGTON, Dec. 9—Gasoline exports from the United States during October were 42,757,000 gallons compared with exports of 44,846,000 in September and 47,116,000 gallons in October of last year, according to census reports of the United States Bureau of Foreign and Domestic Commerce.

NEW YORK AND CHICAGO SCHEDULE BUSY WEEKS WHILE SHOWS ARE IN PROGRESS

NEW YORK, Dec. 12.—Events taking place during the national show weeks in New York and Chicago are announced as follows:

NEW YORK

Jan. 6-13—National Automobile Show, Grand Central Palace.
Jan. 8-13—Automobile Body Builders' Association Show, Twelfth Regiment Armory.
Jan. 9-12—Society of Automotive Engineers' Annual Meeting.

Jan. 8

10.00 A.M.—National Automobile Chamber of Commerce Export Manufacturers' Convention.
6.30 P.M.—Rubber Association Dinner, Waldorf-Astoria.

Jan. 9

2.30 P.M.—National Motor Truck Committee Meeting.
6.30 P.M.—N. A. C. C. Annual Dinner, Hotel Commodore.

Jan. 10

10.00 A.M.—N. A. C. C. Directors' Meeting.
10.00 A.M.—Franklin Automobile Co.'s Sales Conference, Commodore; Luncheon 1.00 P.M.
Evening—Eastern Oldsmobile Dealers' Meeting-Dinner, Commodore.
6.30 P.M.—Motor and Accessory Manufacturers' Association Dinner, Commodore.

Jan. 11

6.30 P.M.—S. A. E. Dinner, Pennsylvania Hotel.
Hupmobile Luncheon and Dealers' Meeting, Commodore.
New York State Automobile Merchants' Association.

CHICAGO

Jan. 27-Feb. 3—National Automobile Show, Coliseum and First Regiment Armory.
Jan. 27-Feb. 3—Annual Automobile Salon, Drake Hotel.
Jan. 29-31—Automotive Electrical Association's Annual Meeting, Congress.

Jan. 27

10.00 A.M.—National Automobile Dealers' Association's Directors' Meeting, LaSalle.

Jan. 29

10.00 A.M.—Sixth Annual Convention, N. A. D. A., LaSalle.
8.00 P.M.—Annual Banquet, N. A. D. A., LaSalle.
N. A. C. C. Advertising Managers' Convention (tentative date).

Jan. 30

10.00 A.M.—Concluding Session, N. A. D. A., LaSalle.

Jan. 31

10.00 A.M.—N. A. C. C. Directors' Meeting.
10.00 A.M.—N. A. D. A. Directors' Meeting, LaSalle.
10.00 A.M.—Franklin Automobile Co.'s Sales Conference, Congress; Luncheon, 1.00 P.M.
Evening—Central and Western Oldsmobile Dealers' Meeting-Dinner, LaSalle.
S. A. E. Meeting and Dinner, Congress.

Feb. 1

Hupmobile Luncheon and Dealers' Meeting, Congress.

New York Reduces List of Approved Headlights

ALBANY, Dec. 12—Fifty-eight headlight lenses, which are now officially approved by the New York State Tax Commission as coming within the anti glaring headlight law of the State, have been eliminated from the approved list in the latest revisions to become effective after April 1.

Until the present revision of the list, in which more than 50 per cent of the approved headlights were eliminated, the list on file at the commission's office contained 100 names of headlights which were officially classified as "anti-glaring."

Ford Asks Water Power Permit on Mississippi

WASHINGTON, Dec. 11—Edsel B. Ford, president of the Ford Motor Co., through W. H. Mayo, has filed an application with the Federal Power Commission for a preliminary permit for one year to develop power rights of the Mississippi River dam No. 1 at Minnehaha Falls at the junction of St. Paul and Minneapolis.

The proposal is to install in the power house, which was built in 1917 by the United States Government, hydraulic turbines sufficient to utilize all the power needed in the operation of a large manufacturing plant producing products at the Ford company. The plant is expected to be located in either St. Paul or Minneapolis. In addition, the application cites that co-operation of the University of Minnesota has been invited to establish an experimental station for the study of hydro-electric sciences.

N.A.C.C. Road Plans Follow New Jersey's

Directors Would Have Taxes Applied Only to Maintenance of Highways

NEW YORK, Dec. 13—Realizing that the 43 State legislatures which meet early in 1923 will take up the matter of imposing a tax on gasoline consumption, directors of the National Automobile Chamber of Commerce devoted the greater part of their monthly meeting to-day, postponed a week, to a discussion of the subject.

After all arguments had been considered, the general sentiment of the directors was that they are not opposed to taxation on motor vehicles, either through registration fees, gasoline taxes or both to an amount sufficient to cover the maintenance of roads, but not their construction. It further was felt that as all highways benefit the public the construction cost should be paid by all taxpayers, whether or not they own motor vehicles.

All taxes on motor vehicles, declared the directors, should not only be used for maintenance, but should be under centralized control. In a nutshell, the views of the N. A. C. C. directors follow along the lines of the New Jersey Plan, which declares that the public shall build the roads and the motor vehicles pay for the upkeep.

Output Reports Read

Production reports read to the directors showed the total output for 11 months of 1922 to be approximately 2,345,000, with November contributing 232,000, which is within 5 per cent of October and twice the volume of the same month last year. The prevalence of low-priced models of closed cars was assigned as one of the main reasons for the unusual fall business.

The directors also received reports from 30 trade associations to the effect that December business will be moderate, but that on the first of the year the market will be active again. November sales were reported to be 75 per cent better than for the same month last year, but 25 per cent less than October, 1922.

The November sales of trucks were about the same as October, 1922, and greater than November, 1921. Sales are better in the Middle West and Far West.

The show date question came up for a short discussion, following the suggestion that national shows held late in the fall might be of greater benefit to the industry, especially dealers, than the winter exhibitions. No action was taken, the matter being laid over for a later meeting.

FREIGHT RATES LOWERED

NEW YORK, Dec. 13—The traffic department of the National Automobile Chamber of Commerce announces that freight charges on motor vehicles from Texas border points (El Paso, Laredo, Eagle Pass and Brownsville) to Mexico City have been reduced approximately 40 per cent. This results from action of the national railways of Mexico establishing a more favorable basis of rates on imports from the United States.

Ford Made 106,352 Sales in U. S. During November

DETROIT, Dec. 13—Retail sales of Ford cars and trucks in November totaled 106,352, all of this business being in the United States and representing the largest November retail business the company has ever had. Retail business in November, 1921, approximated 55,000 to 60,000.

In connection with the volume of business at the present season, Ford officials declare that it is unprecedented and that, in spite of the capacity operation of the plant, it is impossible to meet current demands. Dealers have less than half the stock on hand that they had this time last year, despite the major operation of the plant all year, the total production now reaching beyond the 1,300,000 mark.

N. A. C. C. Truck Members to Convene January 11

NEW YORK, Dec. 12—The motor truck committee of the National Automobile Chamber of Commerce at its meeting to-day decided to hold a special meeting for truck members of the Chamber on Thursday, Jan. 11, which is during the New York show. The meeting will be held at N. A. C. C. headquarters and the entire day given over to discussion of questions of vital importance to truck makers.

To-day's session was attended by representatives of the American Electric Railway Association for a joint discussion of a uniform law that will control the operations of motor trucks as common carriers on the public highways. The automotive representatives were in accord with the association delegates in the major portion of the proposed uniform law, but the two committees have not yet settled upon a taxation cause that is satisfactory to both.

The truck committee also discussed a new caution plate that will be used by all truck manufacturers, but there still remain several details to be settled before the plate can be adopted officially.

WILLYS EXPECTS BIG 1923

TOLEDO, Dec. 12—"We hope that next year will be the greatest in the history of the Willys-Overland Co.," declared President John N. Willys before a group of business men here last night. "Our inventory has been taken and we are planning to produce 45,000 automobiles in the first quarter," Willys said. "This means we will have 15,000 or 16,000 men employed before April 1."

Process Gear Makes Plans for Expansion

Include Construction of Factory Building at Estimated Cost of $150,000

SYRACUSE, Dec. 12—Details of a $500,000 expansion program for the New Process Gear Co., Inc., of this city has been announced by T. W. Warner of Toledo, president.

Construction of a large factory building to cost about $150,000 equipped with new machinery to increase the capacity of the plant to about 600,000 gear sets a year, is included in the program. The contract for the building will be awarded within a few weeks. It is expected that the new plant will be available for occupancy March 1.

Warner announced that the expansion of operations includes new lines of production. Although definite particulars are being withheld, the new product will be for automobiles.

The company has contracts calling for the manufacture of 600,000 differential gears for 1923, according to Warner. This program will demand additional employees, and it is expected that by June more than 1200 will be on the payroll. The present plant is working to capacity and has been for some time.

Officers of the new company have been announced as follows: President, T. W. Warner, Toledo; vice-president, C. W. Miniger, Toledo; secretary, Clayton R. Burt, Syracuse; treasurer, E. H. Witker, Toledo; assistant to the president, Anthony Henninger, Muncie, Ind. Witker is expected to move here within a short time, though Burt will continue manager.

John Wanamaker, Pioneer in Sales Work, Is Dead

NEW YORK, Dec. 13—The death of John Wanamaker marked the passing of a man whose vision was so broad that he foresaw the possibilities of the motor vehicle in the earliest days of the automobile industry.

More than 20 years ago, when Henry Ford was struggling for a foothold, Wanamaker reached out a helping hand and placed the Ford agency in his New York store, this being the first eastern representation Ford ever had. It also is said that the late merchant prince assisted Ford financially at a time when the world looked darkest. W. D. Gash conducted the Ford business for Wanamaker until about 1903, when the Ford company took over the representation.

Wanamaker also figured most prominently in the Selden patent suit, being one of three brought into the litigation, the others being the Ford Motor Co. and the O. J. Gude Co. The suit against Wanamaker was filed Jan. 21, 1904, and later on the three suits were merged into one defense.

Men of the Industry and What They Are Doing

Dr. Nibel Visits Detroit

For the purpose of studying conditions in American automobile plants, Dr. Hans M. Nibel, a director of the Benz Co. of Germany, has been in Detroit, following a visit paid to the New York Benz distributor. While in Detroit he visited the Ford, Cadillac and Packard factories. The Benz company, Dr. Nibel said, at present employs 8000 men and is planning on a production of 4000 cars next year. He stated that the high price of automobiles in Germany makes possession of them possible only for the wealthy. Concerning the four-wheel brake, he said that all companies were trying it experimentally and that he expected it to come as a standard development shortly. Dr. Nibel has been identified with the Benz organization for the last 18 years. He returned to Germany on the steamer "America" on Dec. 13.

Gives All Time to Eisemann

William N. Shaw, vice-president of the New York Air Brake Co., has resigned in order to devote all his time to the Eisemann Magneto Corp., of which he has been president for the last four years, and to other interests.

Rickenbacker Appoints Pelletier

E. LeRoy Pelletier has become advertising manager in charge of sales promotion of the Rickenbacker Motor Co. Pelletier will relieve vice-president E. V. Rickenbacker of much detail in connection with sales promotion, which he has directed from the beginning of the organization. It will enable Rickenbacker to devote more of his time to the engineering, manufacturing and general administration of the business and make closer his association with President and General Manager B. F. Everitt in the production of cars. The appointment will not affect the advertising agency of which Pelletier is head. The agency will continue at its present location, with the founder as president and E. Le Roy Pelletier, Jr., as vice-president. Rickenbacker and Pelletier now are visiting dealers in the Northwest.

William T. Bush Resigns

William T. Bush, for several years a sales executive of Studebaker and Packard, has resigned as director of sales of Gray-Dort in Canada. His plans for the future have not been announced.

White to Develop Disk Wheel

The Wire Wheel Corp. of America has assigned to J. W. White the development of the Buffalo type disk wheel with which the corporation is broadening its manufacturing and distributing organization. White, for many years, has specialized in the development of automotive running gear. His connection with the engineering department of the General Electric Co. prepared him for his entrance into the manufacturing field in 1914 as a maker of axles on the Pacific Coast. Four years later he was in Detroit as manager and chief engineer of the Central Axle Co., a General Motors unit. He has been with the Maxwell Motor Corp. for the last two years and has been largely responsible for the development and adoption of disk wheels as standard equipment on Maxwell and Chalmers cars, as well as the new Maxwell axles.

MAYO HEADS DETROIT RAILWAY COMMISSION

DETROIT, Dec. 12—William B. Mayo, chief engineer of the Ford Motor Co., has been placed at the head of the Street Railway Commission which will manage the city trolley system, Henry Ford having told him to take as much time as the street railway may require.

One of the first things the commission will do will be to endeavor to relieve the street car congestion. Co-operation in this is promised by several of the big Detroit factories which have agreed to dismiss their workers in groups instead of all at one time.

Fields Directs Chalmers Sales

J. E. Fields has been named director of sales for Chalmers cars by Arthur E. Barker, vice-president in charge of sales of the Maxwell Motor Corp. He has resigned as sales manager of the Liberty Motor Car Co. with which he has been affiliated after serving as sales executive with the Hupp Motor Car Corp. Fields' earliest connection with the industry was as a Chalmers distributor at Fargo, N. D., taking this contract at the time Hugh Chalmers took over the former Thomas-Detroit.

Jarrard Goes to Lansing

T. Earl Jarrard, assistant sales manager to M. B. Leahy, general sales manager of the Durant Motor Co., is leaving his Long Island City post to become sales manager of the Durant Motor Co. of Michigan, with headquarters at Lansing. J. W. Hawk, whom he succeeds at Lansing, will assume Jarrard's former position at Long Island City headquarters.

Fitch in Charge of Body Plant

Charles M. Fitch, for several years manager of the Falls Motors Corp., Sheboygan Falls, Wis., has been placed in general charge of the body manufacturing plant being built by the Nordyke & Marmon Co.

J. E. Pickens Resigns

J. E. Pickens has resigned as advertising manager of the Selden Truck Corp., to take charge of the sales service division of Sheffield-Fisher, Inc., Rochester, N. Y., to specialize on direct-by-mail campaigns, sales promotion, sales magazines and house organs. Nearly four years ago Pickens organized the advertising department of the Selden corporation. He came from the Federal Motor Truck Co., with which he had been connected for practically five years in the transportation engineering, sales promotion and advertising departments.

Francis W. Davis in Own Business

Francis W. Davis, who has been with the Pierce-Arrow Motor Car Co. of Buffalo, N. Y., for the past 12 years in various capacities and more recently in the truck division as consulting engineer in charge of design, experimental work, testing and quality, has severed his connection and is now in business for himself as a consulting engineer, specializing in problems of design, manufacture and operation of motor cars, trucks and auxiliary equipment. He is located in the Metz Building, Waltham, Mass.

Curtis in Charge of Doss Plant

T. J. Davis, president and general manager of the Doss Rubber & Tube Co. of Atlanta, one of the South's largest manufacturers of tires and tubes, announces the appointment of T. J. Curtis of Trenton, N. J., as production engineer in charge of the Doss factory. For several years Curtis has been associated with the John E. Thorp Sons Co. of Trenton, rubber manufacturers.

Beneke & Kropf Name Gallup

David L. Gallup has been appointed consulting engineer for the Beneke & Kropf Manufacturing Co. on Rayfield carburetors and thermostats. He has been connected with the engineering department of the Nordyke & Marmon Co. as a consultant for a number of years and previously was in charge of the automobile engineering course at Worcester Polytechnic.

Hinkley Promotes Brede

Oscar M. Brede has been promoted to the position of assistant sales manager of Hinkley Motors, Inc. Specializing in the replacement end of the business which the company is now developing, he will also retain general charge of the service department.

Wilson with McManus in New York

Bernard C. Wilson of McManus, Inc., has gone to New York where he will establish and take charge of a New York office of the McManus organization.

General Tire Sees Sales Gain in 1923

Advises Dealers to Prepare to Double $8,000,000 Business Done in 1922

AKRON, Dec. 9—So optimistic are officials of the General Tire & Rubber Co. regarding the future of the tire industry that they are notifying their salesmen, branch managers and field representatives throughout the country to prepare to double their 1922 tire business in 1923.

At sectional sales conferences conducted by the company, all salesmen are being given instruction in new salesmanship methods. These district conferences supplant one national conference at Akron. The first was held at Atlanta for salesmen in the southern territory; the second at Atlantic City for eastern representatives and the third was held this week at Akron for salesmen from Ohio, Kentucky, Indiana, Michigan, West Virginia and Western Pennsylvania.

The next district conference will be held this week in Chicago for middle western salesmen, and this will be followed by similar conferences as far west as the Pacific Coast.

Vice-president and General Manager William O'Neil, at the Akron conference announced the company's sales for 1922 would approximate over $8,000,000 as compared to $6,500,000 in 1921, an increase not only in units sold but in volume of sales revenues to the extent of $1,500,000.

Unable to Meet Demand

O'Neil also announced that the company estimated it had lost fully $1,000,000 worth of business this year through inability to produce enough tires to fill all orders received. General now is averaging 2500 tires daily. The company is rushing to completion three large factory additions in Akron and has machinery on the ground ready for immediate installation. It is expected that these new plants will be in operation shortly after Jan. 1, practically doubling the company's capacity for daily tire output.

"Go back home and prepare to double your record breaking 1922 business in 1923. The door is swinging open upon the greatest era of prosperity and expansion the tire industry has ever known," O'Neil is telling the salesmen at the district conferences.

O'Neil also claims the company's policy of selecting and restricting its dealers instead of permitting its tires to be sold promiscuously has more than vindicated itself and that the plan is being patterned by many other companies.

OLIVER SENTENCED TO PRISON

ATLANTA, Dec. 13—Elmer Oliver, formerly head of the Oliver Rim Co. of Atlanta, operating a large plant here for the manufacture of automobile rims, has been convicted of a charge of embezzling several thousand dollars of the company's funds, and sentenced to serve 4 to 7 years.

It is announced that other officers of the company also are to be tried on a similar charge. More than 60 witnesses, all stockholders and many of them automobile dealers in this section, were heard during the Oliver trial.

PERSONAL NOTES

Arthur L. Collins Joins Potts

Arthur L. Collins, for the past six months associated with Standard Steel & Bearings, Inc., has entered the tool and alloy steel department of Horace T. Potts & Co., Philadelphia, as sales metallurgist. His work will be with the various mills turning out the Potts' brand of steels, and with the users of these steels in advising on applications and heat treatments. Collins is instructor and lecturer in metallurgy and metallography at Temple University, and has been secretary and treasurer of the Philadelphia Chapter of the American Society for Steel Treating since its inception several years ago.

Western Forge Elects Trabold

Frank W. Trabold was elected to the presidency of the Western Drop Forge Co. of Marion, Ind. He has been identified with the forging industry for many years, principally with J. H. Williams & Co., a company he served in various capacities as sales manager, works manager and vice-president and general manager.

Dunlop Is Reorganized and Will Operate Plant

(*Continued from page* 1195)

before maturity date. Proceeds from the sale of bonds will be used to retire substantially all the present indebtedness of the American company and to provide additional working capital, it is declared by the company.

The corporation is a subsidiary of the Dunlop Rubber Co., Ltd., of England, which guarantees principal, interest and sinking fund of the new bond issue which also is secured by $14,600,100 of the Dunlop Rubber Co., Ltd., first mortgage 8 per cent debenture stock and by a first mortgage on the assets of the American company, valued at more than $16,000,000.

The American Dunlop plant at Buffalo was completed in 1920, the machinery and buildings alone being valued at $16,000,000, while there are 500 acres of land which are said to be worth several millions more. Because of the condition of the automobile industry at the time it was decided to postpone tire making until conditions improved the plant was closed and has been idle ever since that time.

Majority of Owners Prefer Closed Cars

Replies to N. A. C. C. Questionnaire Show 40 Per Cent Want Open Models

NEW YORK, Dec. 13—The closed car has won the election by a considerable margin, defeating its "open" rival by 20 per cent, according to the mail ballot sent out by the National Automobile Chamber of Commerce to 20,000 car owners in ten widely separated states, asking: "When you buy your next car, will it be open or closed?" Returns to date show that 60 per cent of those who replied will buy closed cars and 40 per cent open ones.

Analyzing the ballot, it is found that the reasons for closed car preference are closely related, protection from weather being foremost. General comfort is another big factor, and economy on the basis of all-year use is a third. Appearance also plays an important part.

Trouble With Side Curtains

Other owners specifically mentioned that the difficulties experienced with side curtains has converted them to closed cars. A small per cent say the closed car is better for business purposes. A limited number state they are buying closed cars because of their women folk. The preponderance of the weather, comfort and appearance reasons also indicates that the feminine influence is much stronger than specifically stated.

The following table shows the frequency with which the various reasons were given in the total response of those who preferred closed cars: Weather protection, 44 per cent; general comfort, 34; economy through all-year use, 20; appearance, 7; no side curtains, 4; business reasons, 3; women demand it, .8.

Poor Roads Help Open Cars

Advocates of the open car, the 40 per cent, declare poor road conditions are an outstanding reason for continued open car demand. Price, including upkeep, is another factor, while lightness, which is related both to road conditions and upkeep, also is quoted. Safety was mentioned by many who expressed an objection to being inclosed in case of an accident and by those who feared broken glass. Another large element prefer the open models because it permits them to be in the open air. Business use is an important factor, some owners finding the open car more convenient. Some farmers reported that the open car is more of a utility vehicle as it can be readily used for cartage and also can be driven over fields more readily.

Summed up, the "open" preferences are classified as follows: Poor roads, 23 per cent; price, including upkeep, 16; light weight, 15; safety, 14; more air, 13; business, 10; farm use, 5; touring use, 4; better resale value, .8.

Jordan Orders Keep Factory at Capacity

Distributors Contract for 4350 Cars for December and Next Year Delivery

CLEVELAND, Dec. 11—Four hundred distributors of the Jordan Motor Car Co., in convention at the Winton Hotel placed orders for 4350 Jordan cars at a total valuation of $10,800,000 for delivery during December, January, February and March.

Every section of the United States was represented, and from every distributor came reports of increasing business with strong emphasis on the greater demand for closed cars.

The Jordan company will build approximately 9000 cars in 1922. The demand for closed cars has brought the requirements of dealers far beyond the present capacity of the factory.

This means that Jordan production will run for the next four months at the rate of not less than 1000 cars a month, it was said, and, further, that with this production maintained to April 1, with the normal spring demand coming after the first of April, the factory will be operated at capacity through to July.

Industry Preparing for Output in 1923

(*Continued from page* 1194)

new record from the point of show attendance.

New fields are developing for the sale of automobiles, with the South in particular coming back into the market with the best outlook presented in many months. Conditions in practically all of the Southern States have shown remarkable improvement as prices of farm products have steadily advanced. Road building has been given a marked impetus not only there but in other sections of the country and the advance in the number of highways next year will have a stimulating effect on sales.

Parts makers are operating on steady schedules, which will be increased as the vehicle plants swing back into heavy production. Collections are good, October having shown a decrease of 17.93 per cent in past due accounts.

With the tire makers further advance is being made in replenishing depleted stocks and in placing that branch of the industry on a footing to meet the spring demand. Great benefit is forecast from the approaching conference of representatives of the Rubber Growers' Association of London and the Rubber Association of America which will be held in New York shortly after the holidays for the purpose of considering the recent crude rubber restriction act.

TABLE SHOWING MOTOR VEHICLE PRODUCTION AND SHIPMENTS FOR 11 MONTHS

NEW YORK, Dec. 11—Shipping returns received by the National Automobile Chamber of Commerce place November production at 232,000 motor vehicles, a surprising total, considering the time of the year. This is the eighth consecutive month that production has topped 200,000. Total output for the eleven months of the year is estimated at 2,346,120.

The following table shows production and shipments for the 11 months of the year and shipments for December, 1921 and 1920:

	Output	Carloads			Driveaways			Boat		
	1922	1920	1921	1922	1920	1921	1922	1920	1921	1922
January	91,109	20,057	6,485	15,357	29,283	3,185	7,479	....	93	143
February	122,366	25,505	9,986	19,636	43,719	7,507	10,173	....	99	180
March	172,720	29,236	16,287	27,753	57,273	9,939	16,917	....	75	560
April	219,558	17,147	20,187	31,334	64,634	14,197	22,381	....	1,619	2,960
May	256,219	21,977	18,608	33,416	74,286	15,193	28,827	....	2,381	7,406
June	289,011	22,516	20,269	34,230	60,746	18,834	33,857	8,350	3,947	7,737
July	245,414	23,082	19,514	29,116	52,342	15,533	28,100	8,702	3,726	7,030
August	273,425	23,386	20,758	32,814	34,060	15,218	36,754	7,095	3,595	10,096
September	205,764	20,804	19,002	25,950	24,431	13,840	30,055	5,469	2,959	8,002
October	238,514	17,209	17,808	26,980	14,127	12,971	33,320	2,519	2,226	7,040
November	232,000	13,253	14,264	27,232	9,497	10,528	27,376	659	1,402	5,070

Factory shipments for the other months of 1920 and 1921 follow:

	Carloads		Driveaways		Boat	
	1920	1921	1920	1921	1920	1921
December	11,802	12,100	6,469	7,500	89	134

More Complete Details Given of New Auburn

AUBURN, IND., Dec. 8—More complete details of the new Auburn Six have been announced by the Auburn Automobile Co. The Continental 6-Y engine will be used and the clutch will be Borg & Beck. The gearset will be a Warner three-speed type. Remy starting, lighting and ignition will be regular equipment. The side members of the frame will be 6-in. channels of heavy gage metal. There will be four cross members heavily gusseted with tubular members at each end of the frame.

The new car will be produced in two body styles, a 5-passenger phaeton and a 5-passenger two-door sedan type which will be known as a brougham. The phaeton will have a permanent top as optional equipment.

Fageol Gets Reparation on Shipments of Steel

WASHINGTON, Dec. 10—Partial reparation has been awarded the Fageol Motors Co. of Oakland, Cal., against the Director General, as agent of the Chicago, Milwaukee & St. Paul Railroad Co. and other carriers, for unreasonable rates on pressed-steel side and cross members of automobile truck frames, in straight or mixed carloads, from North Milwaukee, Wis.; Elmhurst, Los Angeles and Burbank, Cal. Reasonable basis of rates were prescribed by the commission.

The rate on side members, with spring hanger attached, on automobile truck frames from North Milwaukee to Los Angeles, which was attacked by the Fageol Motors Co., was not found unreasonable.

Short Lines Evolve Rail Car Lease Plan

WASHINGTON, Dec. 11—Operating losses have been converted into substantial profits through replacing steam passenger trains on short line railroads with motor cars. Announcement to this effect has been made by J. W. Cain, manager of purchases of the Consolidated Purchasing Agency of the American Short Line Railroad Association.

Through the activities of Cain, a finance corporation is now being organized under direction of the association so that member lines and others may acquire motor car equipment under a lease purchase plan, making it possible for the equipment to pay for itself through the saving effected.

Cain states that this corporation will be ready to operate by the first of the year.

It was after an investigation covering the greater part of a year, augmented by answers to questionnaires sent to all member lines throughout the United States and Canada, that the purchasing agency made recommendation and placed orders for more than $250,000 worth of gasoline railroad motor car equipment, representing some 20 cars. Cain declares that the cars are showing excellent results.

CHARLES E. BRENNER DIES

PEORIA, ILL., Dec. 11—Charles Emory Brenner, credit manager of the Avery Co., is dead from heart trouble. He joined the Avery company in 1905 in the capacity of assistant sales manager, was promoted to sales manager in 1909, and served as a director of the company from 1907 to 1914. He was made credit manager in January, 1921.

Kalamazoo Advances Lists on Four Models

President Crawford Assigns Increased Cost of Materials as Reason

KALAMAZOO, MICH., Dec. 8—An increase in prices on four truck models is announced by H. A. Crawford, president of the Kalamazoo Motors Corp., builder of the "Kalamazoo" truck. These advances which are effective Jan. 1, 1923, range from $155 to $300.

The revised list of prices is as follows:

	Old Price	New Price
1½—2-ton	$1,800	$2,100
3-ton	3,145	3,350
4-ton	3,845	4,000
5-ton	4,345	4,500

In addition this company makes a 1-ton speed truck and tractor-trailer units in four, eight and 15-ton sizes and an 18-passenger coach.

"Materials have advanced," said Crawford. "To maintain the Kalamazoo quality, we are forced to raise our prices about 5 per cent on the various heavy models. That is not in relative proportion to the increase in the parts we use."

An interesting order now going through the plant is 12 truck-trailer units for the Noble Hoop Co. of Fort Wayne, Ind. Each unit consists of a 3-ton truck and a 5-ton trailer, both being under control by an automatic air brake system, Westinghouse type. The truck has a heavy duty hoist and windlass, while the standard Wisconsin, 4¼ by 6 engine is regular equipment. This develops 50 h.p. at 1600 r.p.m. The truck has a wheelbase of 186 inches.

The order for the Noble company is finished in a rich, brilliant red, with gilt lettering.

Higher Priced Cars Gain in Metropolitan District

NEW YORK, Dec. 13—Registration of new cars in the Metropolitan territory showed a decline in the low and medium priced models in November as compared with the previous month, but an increase in the number of higher priced types, according to the *Automobile Sales Analysis* compiled by Sherlock & Arnold.

Five cars lead the low and medium priced field with four others some distance behind and the rest falling below the 100 mark in point of sales during the month. There are now 10 cars which show sales in excess of 1000 during the 11 months of the year.

In the higher priced field, two lead in November with sales exceeding 100. Two makes have been sold in excess of 1000 during the 11 months, one showing a considerable advance over the others.

The 11 months of 1922, with a total of 62,957 low and medium priced cars and 7013 higher priced, show a considerable advance over the same period in 1921 when the totals respectively were 41,732 and 4359. November more than doubled the sales of the same month a year ago in higher priced lines and showed an increase of 2000 in low and medium priced car sales.

A recapitulation of sales in the metropolitan territory follows:

	Medium and Low Price	High Price
January	2,014	283
February	2,230	273
March	6,352	632
April	8,428	862
May	8,467	961
June	8,203	865
July	7,816	678
August	5,921	516
September	4,592	511
October	4,518	665
November	4,416	767
	62,957	7,013

COLORADO TEACHER GETS SAFETY PRIZE

WASHINGTON, Dec. 11—Mrs. Anne Rogers, a teacher of Sterling, Col., was received at the White House Thursday and presented by President Harding with a diploma of honor for having contributed the best safety lesson in a teachers' contest, conducted as part of the 1921 national safety campaign.

At the same time J. Schuyler Loomis, 14 years old, Limerick, N. Y., winner in a safety essay contest conducted by the National Grange, was presented to the President and received a certificate of merit.

The presentation exercises culminated a week's entertainment in honor of the winners, provided by the National Automobile Chamber of Commerce which gave Mrs. Rogers $500 in cash and the expenses of a trip to Washington, and the New York boy a gold medal and a trip to Washington.

LONDON CARS REDUCED

LONDON, Dec. 5 (*by mail*)—Since the close of the passenger car show on Nov. 11 three or four firms, makers and importers, have again reduced the prices of the cars they offer. The most notable of these are Citroen with a reduction of approximately 15 per cent, and Austin who has brought down the price of its 7-hp. miniature model from £225 to £165.

BUICK WILL NOT REDUCE

FLINT, MICH., Dec. 12—President H. H. Bassett of the Buick Motor Car Co. states that his company will not reduce prices. As a reason for not going below the present level he points to the high prices of leather and lumber and the expected increase in prices of steel in January. Buick produced 16,000 cars in November.

Hudson, Essex Make New Price Reduction

Four Models of Former Quoted Lower—Latter Takes $100 from Coach

DETROIT, Dec. 11—For the third time this year Hudson and Essex prices have been reduced, the latest cut announced to-day taking $200 off the Hudson sedan and $100 off the coach and two phaetons. Only one Essex reduction was made, the coach being quoted $100 lower.

Hudson started the year with the 7-passenger phaeton listing at $1,745; on July 1 this was cut to $1,695, and on Sept. 22 to $1,575. Now it is $1,475. The Essex coach listed at $1,345, $1,295 and $1,245 on these dates, and now is $1,145.

The revised list as of Dec. 11 is as follows:

	Old Price	New Price
HUDSON		
4-pass. Phaeton	$1,525	$1,425
7-pass. Phaeton	1,575	1,475
Coach	1,625	1,525
Sedan	2,295	2,095
ESSEX		
Coach	$1,245	$1,145

The new list makes especially noticeable the small differential between the open and closed models. Hudson and Essex production this year was over 60 per cent closed cars.

Regular Dividend Declared

Announcement of the regular quarterly dividend of 50 cents a share and an additional dividend of 25 cents a share came with the declaration of the Hudson new prices. Both of these are payable Jan. 2.

The first annual meeting of Hudson stockholders since the placing of its stock on the open market will be held Dec. 20, when a report will be made to stockholders. The meeting then will be postponed to Jan. 20 to give an opportunity for a study of the report.

During the fiscal year ended Nov. 30 the company reports the manufacture of 61,110 cars. Production in 1923 has been set at approximately 100,000.

Fisk and Howe Announce Increased Tire Prices

NEW YORK, Dec. 13—Two tire manufacturers have followed Kelly-Springfield in increasing prices, Fisk having announced a new schedule ranging from 10 to 12 per cent, while Howe has increased prices 10 per cent. Higher schedules by other companies are rumored, with announcements expected shortly.

Howe Rubber Co. reports operating to capacity and states it is from 30,000 to 40,000 casings, and as many tubes, behind on spring orders. It also estimates that in 1922 it will do as much business in dollars as in 1921, with about twice as much in sales by units.

Nash Tells Dealers Prices May Advance

Says His Companies Are Unable to Guarantee Lists Between Now and Spring

MILWAUKEE, Dec. 8—The opinion that motor car prices probably will witness an increase before next spring was voiced by Charles W. Nash, president of the Nash Motors Co. and the LaFayette Motors Corp., in an address at the annual sales conference of Nash and LaFayette distributors and dealers in the Wisconsin and Upper Michigan territory in Milwaukee yesterday.

Nash said that frequently in recent weeks he has been asked by dealers and others what he thought of the outlook with reference to prices. In reply, he said, he has been able to say only that so far as his companies are concerned, they are unable to guarantee dealers against a price increase between now and spring.

Raw materials and other elements entering into the manufacture of motor vehicles appear from present indications to warrant an increase in prices, Nash said. Whether or not this course will be found necessary he said he was not prepared to state positively.

Sees Big Leap in 1923

The automotive industries are due for the greatest leap forward in all the history of the business during the first six months of 1923, Nash declared. Conditions in the agricultural communities have improved so much, he said, that already a bigger and broader market has opened which doubtless will be responsive to broad development after the winter season is over. This is business of a better character than city business, for the city buyer as a rule is merely making a replacement, while the farmer generally is a new customer.

While counting largely for the increased sales next year over the remarkable volume of 1922, Nash said that urban business is bound to be good, for a great many people are still holding off buying cars because of insecurity of positions or for any number of other reasons, and talk of the point of saturation being reached is not substantially based.

Loening Tests New Type of Control for Airplanes

NEW YORK, Dec. 12—Grover Loening, airplane inventor and constructor, announces that flying tests made for a week have demonstrated the complete success of a new type of airplane control of his invention. The tests were made over the East River off Thirty-first Street, where the Loening factory is located. For the trials the Loening monoplane flying yacht was used.

The invention, which is called a lateral pressure equalizer, is mounted on the extreme tip of each wing and departs radically in its effect from the fundamental principles of lateral control as used in the Wright and Curtiss types. In the construction of the device a small section of the leading edge of the wing is extended beyond the tip to which is hinged the pressure equalizing flap, which is controlled, through cables and levers, by the pilot.

The new control can be applied to biplanes and other types of machines but is most valuable for monoplanes due to the depth of chord of their wings.

FIRESTONE DENIES INTEREST IN PLANT

AKRON, Dec. 12—Continued reports that he is heavily interested in the establishment of a proposed $10,000,000 automobile plant at Ridgeway, W. Va., are steadfastly denied by Harvey S. Firestone, president of the Firestone Tire & Rubber Co.

When told Virginia papers had published reports to the effect that deeds for land being acquired for the new plant were being made out in his name, Firestone branded the stories as absolutely false.

Firestone was approached by Detroit interests several weeks ago regarding the Ridgeway venture, but says he did not interest himself in the proposition at all. Since then, due to what he terms as false reports circulated regarding his alleged interests in the venture, Firestone says he has been swamped with correspondence much of which has come from persons owning property in the locality of the reported new plant, all seeking to sell it to him.

Kentucky Limiting Load on Basis of Tires Used

LOUISVILLE, KY., Dec. 11—The load limit law, enacted by the 1922 General Assembly, goes into effect Dec. 15 and continues until April 1, limiting vehicles with steel tires less than three inches wide to 5000 pounds, and 6500 pounds if the tires are three to four inches wide; 6800 pounds if the tires are four to five inches wide, and 7000 pounds if the tires are over five inches wide. For rubber tires less than three inches wide the limit is 5500 pounds, up to four inches 6500 pounds, up to five inches, 7500 pounds, and five inches or more 10,000 pounds.

NO HIGHER BAY STATE TAX

BOSTON, Dec. 9—Chairman Williams, confirmed as chief of the Public Works Department to succeed the late John N. Cole, said, as his first public utterance:

"There will be no recommendation from this department for increased fees on motor vehicles."

France Evades Duty Issue, Says Belgium

Failure of London Conference Shelves Tariff Question Until Next Year

PARIS, Dec. 2—That France is side stepping the question of automobile import duties is the charge made by Belgian manufacturers. As soon as it became known that the United States was prepared to establish a 25 per cent import duty on automobiles, the Belgian makers, who are at present protected by only a 20 per cent duty, proposed that the question should be discussed at the meeting of International Automobile Manufacturers' Associations, held in London.

Belgian makers pointed out that France had always justified her 45 per cent import duty by the argument that it was necessary to bring the American duty down to a reasonable figure. The United States having decided on a 25 per cent duty, France ought to have been the first to follow suit.

By sending to the London conference only the paid secretary of the French Manufacturers' Association, and withholding from him all authority to act, the French industry deliberately side-stepped the issue, declare Belgian makers.

Delegates Late in Arriving

For some unknown reason the British delegate had no authority, and because of a misunderstanding, Signor Nathan, the Italian delegate, and an official of the Fiat Co., reached London three days too late.

By reason of this the question of European import duties has been shelved until the next meeting of European automobile manufacturers to be held in Brussels in January. The Belgian delegates declare that they refuse to be stifled.

While Belgian automobile manufacturers are protesting against the French attitude in maintaining a 45 per cent import duty, the Belgian government is at work on the revision of the tariff laws, and, in all probability, will propose a rate of 640 francs per 100 kilos, which is four times the Belgian pre-war rate. The rate against German cars would be twice this amount.

The proposed change is far from meeting with complete satisfaction in Belgium. In the case of the lower priced American cars such as the Ford, Chevrolet and Overland, as well as the European big production jobs Citroen and Fiat, it is estimated that it will be equivalent to a 55 per cent ad valorem duty. For the more costly cars such as Renault, Panhard-Levassor, Rolls-Royce, Hispano-Suiza, and Cadillac there will be little change. As Belgium is not building low priced cars, the new law will give her manufacturers no advantage, while it threatens to shut out of America such makes as Minerva, Excelsior and Metallurgique.

State Road Officials Oppose Finance Plan

Say Motor Vehicle Taxes Should Help Pay for Construction of Highways

KANSAS CITY, Dec. 11—The National Association of State Highway Officials, meeting here, passed a resolution dissenting from the proposal that motor vehicle revenues be limited to maintenance requirements. It advocates, instead the payment of a part of the construction cost through motor vehicle taxes.

The resolution suggests that one-third of the total cost of Federal, State and county road programs be met from motor vehicle taxes, and favors a gasoline tax of not less than 2c a gallon.

This action seems to be a result of the general sentiment throughout the country against the addition of general taxes of any kind, and the demand of the public for economy. It appears that the highway officials are desirous of carrying out their road programs as fully as possible, and that in raising money for that purpose they are seeking the lines of least resistance.

The automotive industry was represented at the meeting by A. J. Brosseau, president of Mack Trucks, Inc.; R. D. Chapin, president of the Hudson Motor Car Co., and Pyke Johnson, secretary of the National Automobile Chamber of Commerce Highways Committee. These men attended the meeting of the Motor Truck Regulation Committee, held during the session, and for one afternoon discussed the general problems of highway finance and motor vehicle regulation.

Connecticut Official Will Urge Truck Road

HARTFORD, CONN., Dec. 11—State Highway Commissioner Charles J. Bennett will recommend to the Legislature which convenes Jan. 3 the construction of the special highway for the exclusive use of motor trucks, extending from Bridgeport, Conn., to the New York State line, which has been under discussion for some time.

The proposed truck route is about 30 miles long, and the highway is planned to be 22 feet wide. One of the plans suggested to meet the expense of maintenance is a tax of two cents a ton-mile, which would bring in a revenue of about $280,000 annually, the estimate being that 14,000,000 ton-miles of pay freight annually pass over the Boston Post road to the New York State line.

WHITE WINS TAX FIGHT

CLEVELAND, Dec. 11—The White Motor Co. has won its fight against the payment of a State personal property tax on $3,025,000 set aside by the corporation for the payment of income and excess profit taxes due the Government. The White company, in making its tax return to the State in 1919, exempted this sum, and the county treasurer of Cuyahoga County rejected the return on the ground that the corporation should have included the sum due the Federal Government.

The State Supreme Court held that Federal income and excess profits taxes are legal and bonafide debts and may be set up by the individual or corporation against credits when making personal property returns to the State.

FINANCIAL NOTES

Van Wheel Corp., stockholders, manufacturer of cast metal hollow spoke aluminum and malleable iron automobile wheels, have authorized the sale of $250,000 worth of preferred and common stock, increasing the company's capital from $250,000 common to $500,000 common and preferred. General expansion of the organization and an increased production are planned. T. Goldsborough Meachem is president of the company.

Mack Truck, Inc., has declared an initial dividend of $1 on the common stock and the regular quarterly payments of 1¾ per cent on the first and second preferred stocks. The common dividend is payable Dec. 28 to stock of record Dec. 18, while the preferred disbursements are payable Jan. 2 to stock of record Dec. 20.

Reo Motor Co. has declared an extra dividend of 1 per cent and the regular quarterly dividend of 1½ per cent both payable Jan. 2 to stock of record Dec. 15.

Spicer Manufacturing Co. has declared the regular quarterly dividend of 2 per cent on the preferred stock, payable Jan. 2 to holders of record Dec. 21.

Dunlop Rubber Co., Ltd., of England, in its balance sheet shows a trading profit of more than £1,000,000 for the last 10 months.

Chandler Motor Car Co. has declared the regular quarterly dividend of $1.50 a share, payable Jan. 2 to holders of record Dec. 19.

AC Spark Plug Co., Flint, Mich., has increased its production facilities by adding to one of its factory buildings.

FRENCH RULES ON TRUCK DUTY

PARIS, Dec. 5 (*by mail*)—Motor trucks weighing 2½ tons or more are now subject to the same ad valorem duty of 45 per cent as applied to passenger cars, according to a decree just issued by the French Government. The 45 per cent duty also applies to spare parts for trucks.

ATLANTA MAY GET TIRE PLANT

ATLANTA, Dec. 13—Atlanta may be the site of a large plant for the manufacture of rubber goods and tires, according to Alexander Lerner of Ottawa, Can., and W. T. Inggram of London, Eng., who are here in the interests of a large rubber manufacturing company in England that is planning to establish a branch plant somewhere in the South.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

During last week the tendency in the call money market was toward greater firmness, although the actual rates remained unchanged at 4 per cent to 5½ per cent as in the preceding week. The situation remained unchanged for fixed date maturities. The rate for all periods from 60 days to six months was still quoted at 5 per cent. The prime commercial rate continued at 4½ to 4¾ per cent.

The October net operating income for Class I railroads totaled $85,234,000, which is equivalent to an annual return of 4.05 per cent on the tentative property valuation. This compares with $105,425,600 and a return of 5.01 per cent for October, 1921, and $58,457,000 and 2.88 per cent for September, 1922. For the first ten months of 1922 railroads of the United States showed a total net operating income of $614,627,000, representing an annual return of 3.97 per cent as compared with $499,346,000, and a 3.23 per cent return for the corresponding period last year.

Revenue freight loadings for the week ended Nov. 25 totaled 955,495 cars, a decrease of 13,599 from the preceding week, which was attributable principally to the falling-off in ore shipments because navigation on the Great Lakes has stopped. It was an increase, however, of 282,030 cars over the corresponding week last year. For the four weeks of November, car loadings amounted to 2,873,325 cars, a decline of 2.4 per cent from the preceding four weeks, but a 30 per cent increase over the corresponding four weeks in November, 1921.

The output of pig iron for November was 2,849,703 tons, which is the largest total since November, 1920, and a gain of 11 per cent over October's output. Production is now going on at a yearly rate of 35,500,000 tons, which is more than twice last year's output.

Report Shows Amounts Due Banks by Wagner Electric

ST. LOUIS, Dec. 11—In a return made in the St. Louis Circuit Court in petition for an order to show cause why a receiver should not be appointed and to stop the sale of the Wagner Co.'s assets to the Wagner Electric Corp. of Delaware, amounts due to St. Louis and New York banks by the Wagner company in December, 1920, are shown to have been $5,115,000.

Of this $2,719,000 was due St. Louis banks as follows: First National, $1,115,000; National Bank of Commerce, $800,000; Mercantile Trust Co., $500,000, and Merchants-Laclede National, $300,000. Of the $2,400,000 due to New York banks, $1,300,000 was due Guaranty Trust Co., $650,000 Bank of Manhattan and $450,000 National City. The indebtedness at the beginning of 1921 was $7,139,258, it is said.

Buyers Order Cars as Christmas Gifts

Sales in Chicago Satisfactory—Dealers Specialize in Winter Inclosures

CHICAGO, Dec. 9—Although rètail sales of automobiles have fallen off steadily in Chicago and Cook County for the last three months, the rate of decline has been so gradual that business is still maintained at a level which dealers generally consider satisfactory for this season of the year. Public interest in automobiles is high and dealers whose sales have shrunk considerably have no lack of prospective buyers, many of whom are waiting until after the first of the year.

A good many buyers have placed orders for Christmas delivery. This is especially true in the higher price field, with closed models predominating.

Some enterprising dealers are creating a profitable market for new and used open cars by equipping them with winter inclosures. One Chicago distributor of a popular line of cars has patented its own design of winter inclosure, the sides of which are constructed with rattle-proof metal frames and a maximum of glass, with well-fitted doors and windows that open easily for ventilation. This equipment may be installed with the ordinary soft collapsible top or with a special permanent soft top. The company maintains its own shop in which it manufactures between 40 and 50 of these outfits each week.

Outlook Good for January

There are indications that January business will open well. Some dealers report a considerable number of orders placed for January delivery. The distribution of bonuses and dividends by many large business concerns is expected to give considerable stimulation to automobile buying.

The present trend of buying is fairly well indicated by figures furnished by the Central Automobile Financing Association which keeps a record of all time-payment sales for which official documents are recorded. These sales are estimated to represent between 65 and 75 per cent of all retail sales in Chicago and Cook County.

For the four weeks ending Dec. 2 the number of such sales was 2240; for the four weeks ending Nov. 4, 2691; and for the four weeks ending Oct. 7, 3060. This shows the tapering off in demand, although the decline in these figures probably was somewhat greater than the actual decline in sales because of the fact that since the $50 Ford reduction in October a greater proportion of Ford sales have been for cash.

SOUTHERN TRUCK REOPENS

GREENSBORO, N. C., Dec. 13—The plant of the Southern Truck & Car Corp. has resumed operations after a long period of idleness, following the complete reorganization of the business, with Dr. W. P. Knight of Greensboro as president, and C. E. Lowe, secretary, treasurer and general manager. The company manufactures the Southern truck, quite extensively used by manufacturers in the southeastern territory, and also manufactures special truck bodies.

INDUSTRIAL NOTES

Anderson Tractor Co., recently announced formed at Anderson, S. C., with $200,000, is planning the immediate construction at Anderson of a large plant for the manufacture of tractors and sprays especially adapted for use in the southern cotton fields, according to W. S. Anderson, president of the company. Temporarily the plant will assemble tractors only, but later will manufacture many of its own parts.

Greenway Auction Co., of Columbia, Tenn., has acquired an 87 acre tract near Columbia and will start construction shortly of a plant for the manufacture of automobile tires. Total investment, President J. B. Greenway advises, will be around $200,000

Raymond E. Bell has opened offices in the Woolworth Building, New York City, as consulting industrial and management engineer. Associated with him will be O. H. Blackman, until recently president of the Blackman Co., New York.

Receipts Show Georgia Farmers Extend Buying

ATLANTA, Dec. 13—Tangible evidence of the big improvement in automobile sales in Georgia during 1922, as compared with last year, is shown in a report of the State motor vehicle department to the effect that total receipts the first 11 months of this year were about $125,000 larger than the entire total for 1921. This includes only payment for licenses. Gross collections have been $1,827,388 the first 11 months of this year. Total licenses issued were 128,479 for passenger cars and 16,876 for trucks. This is 17,000 more licenses than for all of 1921.

The big increase this year has been in licenses to smaller counties, especially the past few months, indicating that farmers are doing considerably more motor car and truck buying at this time than in the past two years. In 1921 by far the largest number of licenses issued were in the counties where larger cities were located, such as Atlanta, Savannah, Macon, etc. This year rural counties are holding their own, and probably close to 90 or 100 per cent better than last year.

SWEDISH AERIAL EXHIBITION

NEW YORK, Dec. 12—An international aerial exhibition will be held at Gothenburg, Sweden, from July 20 to Aug. 12, 1923, under the auspices of the Royal Swedish Aero Club and in connection with the tercentennial exposition of Gothenburg.

METAL MARKETS

While the steel market as a whole presents the absence of marked developments which is a usual end-of-the-year condition, the sheet market, especially that for automobile sheets continues to attract considerable attention, consumers being actively engaged in negotiations for good-sized tonnages with the various independent producers. It is generally supposed that the American Sheet & Tin Plate Co. is booked to the extent of its capacity for automobile sheets during the first quarter of the coming year. For that reason maintenance of its 4.70c. quotation which, it had been generally expected in the steel market, would be revised upward, is interpreted by the independents as imposing no obstacle to their continuing the 5c. price for first quarter 1923 shipments.

The fact, however, that the Carnegie Steel Co.'s sheet bar price for the first quarter of 1923 is $36.50 serves to impart a certain amount of steadiness to the sheet market, restraining for the time being either a sharp upward or marked downward revision of prices. In other words, the corporation has once more stepped into the market at a time of much uncertainty and by the correct use of its leadership saved it from the possible consequences of this uncertainty. Quite a little buying of strip steel by automotive consumers is reported to have followed on the heels of first quarter contracts placed by several units of the General Motors Corp. Prices are well maintained at 2.90c. for the hot-rolled and 4.50c. for the cold-rolled. Makers of cold-finished steel bars are moderately busy.

The supply of hot-rolled bars at prices within the reach of the makers of cold-finished bars has been exhausted, and at 2c. for hot-rolled the margin on the cold-rolled product is reduced to $10 per ton which was considered unsatisfactory even in pre-war times

Pig Iron.—Three months ago the pig iron market was bent upon demonstrating that the price limits imposed during the war by Mr. Baruch's fiat can be made to look very reasonable in piping times of peace. To-day indications are that the closing transactions of the year will be virtually on the same levels as the 1921 average, $23 @ $24, valley base. A valley furnace interest booked 10,000 tons of foundry at $25, valley furnace. In some of the markets prices have held up more than in others, but adjustment is now in progress. Since Oct. 1, the pig iron market has declined approximately 25 per cent. Automotive foundries are taking advantage of the return to more normal price levels to replenish their depleted supplies.

Aluminum.—Most of the offerings by importers for the first half of next year met with ready acceptance by consumers and representatives of foreign producers assert that practically all of Europe's aluminum producing capacity for the first six months of next year has been committed. There is a wide spread between the quotations of the various foreign interests, the range being from 22 to 22½c. for 98 to 99 per cent pure virgin ingots and from 22½ to 24c. for the 99 per cent pure. Germany is reported out of the market and Norway has only very limited quantities to offer for early shipment.

Copper.—Automotive demand for wrought copper and brass products is reported as excellent. The raw copper market is on the up trend. Most of the metal offered at below 14c. has found its way into consuming channels and 14c. has become an inside figure.

Calendar

SHOWS

Jan. 6-13—New York, National Automobile Show, Grand Central Palace, under auspices of National Automobile Chamber of Commerce.

Jan. 8 - 13 — New York, Second National Automobile Body Builders Show, Twelfth Regiment Armory, under the auspices of the Automobile Body Builders Association.

Jan. 27-Feb. 3—Chicago, Annual Automobile Salon.

Jan. 27 - Feb. 3 — Chicago, National Automobile Show, under auspices of National Automobile Chamber of Commerce, Coliseum and First Regiment Armory.

FOREIGN SHOWS

Dec. 15 - Jan. 2 — Paris, Aeronautical Salon, Grand Palace. Chambre Syndicale des Industries Aeronautiques, 9 Rue Anatole de la Forge.

Jan. 13-24 — Brussels, Sixteenth International Automobile and Cycle Exposition, Palais du Conquantenaire.

April - July, 1923 — Gothenburg, Sweden, International Automobile Exhibition, Sponsored by the Royal Automobile Club of Sweden.

RACES

May 10 — Berlin - Grunewald, German Grand Prix.

CONVENTIONS

Jan. 15-19—Chicago, Thirteenth American Good Roads Congress and Fourteenth National Good Roads Show.

Jan. 29 - 31 — Chicago, Annual Meeting, Automobile Electric Service Association, Congress Hotel.

S. A. E. MEETINGS

Metropolitan Section

March 15—Speaker, William P. Kennedy, President, Kennedy Engineering Corp.; Subject, Trolley Buses and Flexible Vehicles for Street Railway Service.

April 19—Speaker, Edw. E. La Schum, General Superintendent, Motor Vehicle Equipment, American Railway Express Co.; Subject, Engineering Features of Fleet Operation.

May 17—Speaker, F. P. Gilligan, Secretary, Henry Souther Engineering Co., Subject, Metallic Materials for Automotive Work.

Other Meetings

Jan. 9 - 12 — New York, Annual Meeting.

Jan. 31 — Chicago Meeting and Dinner of the Society at the Congress Hotel.

Tool Makers Oppose Steel Number Plan

WASHINGTON, Dec. 11—Sponsored by the Society of Automotive Engineers and the American Society of Testing Materials, a sectional committee will be appointed to make an investigation looking to the uniform numbering of forging, casting, structural tool and other steels. This action was decided upon at a meeting held under the auspices of the Department of Commerce.

Vigorous opposition was expressed by makers of tool steel to the inclusion of this class of material in the investigation, but the resolution was carried by a vote of 18 to 3 with 7 not voting. The sectional committee will be made up of representatives of all the interested parties, including producers and consumers.

Parker Voices Protest

The recommendation in favor of the investigation at first excluded tool steel after protest had been voiced by J. H. Parker, of the Carpenter Steel Co., Reading, who, as a representative of the tool steel industry, read a statement from Dr. J. A. Mathews, president of the Crucible Steel Co. of America, declaring that numbering of tool steel was impracticable. His attitude was similar to that of other makers of tool steel.

According to R. M. Bird of the Bethlehem Steel Co. the success of this phase of activity in the Society of Automotive Engineers was due to its system being based entirely on chemical composition.

F. P. Gilligan, Hartford, representing the S. A. E., said that the society first decided on the compositions needed by automotive makers and then designated numbers, and that it is satisfied with the numbering system and that it has not reached its limitations. He said the society is ready to co-operate for the extension of the system but that it had been distributed through outside units distorting the numbers, and he declared that if there is an extension of steel grades to fit all numbers the S. A. E. will find itself without a numbering system.

The S. A. E. system was commended by George L. Norris, New York, also representing the society. Morris favored the extension of the system to steels which it does not now cover. Like others he opposed using the brand name with the numbering system and said such a practice would run counter to the by-laws of the S. A. E. and the A. S. T. M.

Fenn Urges Truck Use Before Rivers Congress

WASHINGTON, Dec. 8—F. W. Fenn, secretary of the National Motor Truck Committee of the National Automobile Chamber of Commerce, urged upon the delegates assembled here yesterday for the eighteenth annual convention of the National Rivers and Harbors Congress to give careful study to the co-ordination of waterways and railways in the wholesale phases of transportation and the motor truck in the retail end, as a means of lowering distribution costs.

In emphasis of this need he pointed out that the prediction had been made by a railroad executive that with the next real revival of general business the country in all probability would be confronted with the most severe congestion of railroad traffic and the greatest inadequacy of railroad facilities ever experienced in its history.

CAMPBELL COMPANY IN FRANCE

BUCHANAN, MICH., Dec. 11—Following the return of L. J. Campbell of the Campbell Transmission Co. from a three months trip to France announcement is made of the formation of the Societe Francaise des Changement de Campbell, capitalized at 2,280,000 francs for the manufacture of Campbell transmissions in France. M. Barron, formerly chief engineer of Rochet-Schneider, has been made general manager of the company. A fully equipped factory has been purchased.

Fornaca, Back Home, Talks About Tariff

PARIS, Dec. 5 (*by mail*)—"By objecting to the high import duties existing in several European countries, American automobile manufacturers display an incomplete knowledge of conditions on this side of the Atlantic," declared Engineer Fornaca, Vice-President of the Fiat Co., on his return from a visit to the United States.

Fornaca says:

Personally, I approve the action of the American Automobile Chamber of Commerce in securing a reduction of the American import duty to 25 per cent, and I should like to see Italy reciprocate. The fact must not be lost sight of, however, that we in Europe are bound by treaties which are not always of an equitable nature.

Thus, if we in Italy lowered our duty to the level of the American standard, we should be obliged to admit several other nations to the same benefits without those nations being in any way obliged to reciprocate. While it is reasonable that we should admit American cars into Italy on a 25 per cent basis, it is unjust that by so doing we should be obliged to admit cars on the same basis from nations which maintain a 45 per cent duty against us.

Fornaca passed through Paris on his way to Turin after a six weeks tour in the United States, during which he visited some of the leading American automobile factories, as well as several of the large steel plants in Pittsburgh and vicinity. He was accompanied on his tour by the production engineer of the Fiat Co.

WILLYS CLAIM SETTLED

TOLEDO, Dec. 12—By order of John M. Killits in the Federal Court here, the Willys-Overland Co. will pay to the receivers of the Willys Corp. the sum of $10,000 in full settlement of all book accounts, claim and counter claims not a part of the big settlement made several months ago. This winds up all disputed points between the two companies.